

Pollinaria 2018

Materials and Methods

ollinia
retinacula
binocular
P of the Hoya flower are very small but the five dark brown colored
are readily visible in the crown of the hoya flower without the aid of
magnification. In working to remove the pollinaria I use a "Swift"
microscope with 10x magnification. With the sharp end of a fine sewing
needle inserted under the outer end of the retinaculum, a gentle lift will usually release
the entire structure intact (I now use the end of a hypodermic needle). Those removed are
placed on a slide with a 1 mm imbedded graduated scale, as a measuring device, divided
into microns (100 parts). The slide is wetted with a drop of Kew solution (Alcohol,
glycerin, water, and formaldehyde). The removed pollinaria are easily transfer to the
wetted area. Most pollinaria can be examined at thirty power or above. At around 30-40
magnifications the pollinaria are easy to focus since the field depth is relatively small.
An overall view is good at these magnifications.

I have found that a magnification of 100 power is best for detailed study of most
holia pollinaria. For this I use a Bausch & Lomb monocular scope. It is provided with a
EW 10 XD/20.50 -14.5 mm eyepiece. The 10x lens is 0.25. By the time the pollinaria
is in good general focus in a SLR camera the magnification with this lens combination is
approximately 160x (actually it is slightly more than 162) (now use a digital camera, no
adaptor needed). My camera is provided with a microscope adapter, which allows me to
switch from the Swift binocular scope (for extraction) to the monocular for measurements
and photography. The camera mounts on the eyepiece, and the SLR feature allows visual
focusing through the microscopes lens system.

Problems encountered: At near 100x magnification even though the pollinaria is
a small object (we are dealing with fractions of a millimeter) the depth through which
you must focus becomes greater (the depth of field is shallower). This requires a number
of photos at various focal planes to record all the features. Thus presentations must be of
a number of photos or composites. The retinaculum is especially deep i.e. three
dimensional and thick, especially at the head and central portion. The photos (copies) in
the data pages are a best average photo depiction of the structure or a composite in a few
cases. At 165 magnifications some pollinaria are too large to fit within the view area
and thus must be a composite of at least two photographs.

Problem areas in addition to the above are:

- (1) When removing pollinaria, both pollinia do not always stay adhered to the caudicle. In some instances neither of the two pollinia may remain attached. The longer the flower is open the more this becomes true.
- (2) Occasionally, especially from herbarium material, the pollinia may be withered (not the general situation). Preserved dry flowers must be thoroughly soaked in Kew solution (or boiled) before removal is practical.

- (3) Destruction of the pollinia (since it represents high protein) by bupestids or other insects is occasionally encountered.
- (4) A few pollinaria, especially very large ones, have a tendency to lie at a 45° angle to the surface of the slide when still attached to the caudicle, so to measure their true width, they must be separated from the caudicle and then maneuvered to lay flat.
- (5) One must work quickly since the heat from a strong light source will start to deform (wither) the pollinia even when in the Kew solution on a slide.
- (6) Upon extraction from the anthers the pollinia and retinaculum often twist and turn. This is especially true of translators located well down the retinacular column. It becomes a real challenge to get them to lie in their original configuration, and flat on the slide. Long retinaculum with the translators attached well down on the column tend to raise their head (the inner apex) above the slide surface, adding to the depth of the focal plane. This adds to the difficulty of getting a single clear photo of the structure. In some cases the twisting is almost impossible to undo. Drying the slide is an aid and using two needles for manipulation helps. The pollinaria of course can be studied from the top (normal positioning) or turned on its back and studied from the bottom.

I have been using 100 ASA color film or recently 200 ASA speed color film. The faster speed film cuts down on the exposure time (and thus camera battery renewal). I at first used the auto exposure meter of the camera but learned that most photos were overexposed (more true for floral parts than of the pollinaria through the monocular scope). With a tensor lamp directly below the stage, directed up through the field it takes only a fraction of a second for full exposure, possibly 1-2 seconds. I now use the bulb camera setting. Photos show more and clearer detail than the photocopies or scanned images presented here but are too expensive to use in this presentation.

Pollinaria Formation

The pollen of the *hoya* species I have examined are coalesced into gelatinous masses. (It is not powdery). Each mass is covered with a continuous clear, rather tough membrane. The containing receptacle is a pocket (at first an closed envelope) in the side of the triangular membranaceous anther. This anther is fused in its central basal region above to the lower surface of the inner coronal lobes basal portion and along the edge of the stylar table between the fused stigmas. The (anther) apical triangular and lateral edges being free. The anther points inward toward (and often covers the stylar region) the center of the flower. There are two pockets in each anther's apical region arranged in a fashion, so as the upper (inner) ends are nearly touching, forming a triangle that thus follows the outline of the anther edge. The edges of the envelope are thickened and buttery yellow in color. These pockets are somewhat linear as

are most pollinia. It is in these pockets that the pollinia form at a very early stage of flower development even prior to the development of the corona. The sepals are still covering the whole floral bud and the corolla has not begun to enlarge beyond the calyx. At this stage the sepals are the most visible structure of the developing flower bud. At this early period the pollen masses are gelatinous, turgid, undifferentiated, uncolored masses; shortly developing a pale yellow color, and gradually solidifying.

The pollen masses early on are completely covered by the anther envelope and sealed within it. As development continues the pollen mass deepens in color (yellow) and differentiates into characteristic parts. Eventually the envelope separates along the outer edge freeing the enclosed pollinium, which however remain in place unless disturbed. A sterile edge of varying length differentiates along the edge of the pollinium adjacent to the inner envelope edge (its narrow side). This is the thinnest portion of the pollinium as seen in cross section. This pellucid, sterile edge differs in structure and length among the various *hoya* species. It is absent in the *Section Eriostemma* Schlechter (now Genus) species (now given Genus status 2001); very rudimentary in the *Section Rudimentalia* Kloppenburg (as exemplified by *Hoya darwinii* Loher). In most species it is well defined and readily visible under a microscope even at low power. This has been called the “germinal mouth”. One more bit of structural detail (taxonomic): The groove formed by the anther pockets two surfaces (envelope like) is not just a “V” shape. As a result of irregularities in this groove if you cut a pollinia crossways you will find irregularities in the surface of the pellucid edge (the curvature is not continuous) its development conforming to irregularities of the groove (See photos on page 11). In many cases there is a linear vacuole separating this edge and the gelatinous pollen, either partially or nearly completely. Upon germination the pollen tubes burst forth (usually) first at the inner end, the end nearest the retinaculum, of the sterile edge where a pore is present allowing honeydew to enter. Almost immediately, however the whole side splits with emerging pollen tubes.

If germination occurs near the stigmatic receptive area the whole bundle of individual elongating, translucent, colorless, pollen tubes are directed to the small stigmatic receptive area. What starts off, as a flat linear formation of pollen tubes emerging along the entire length of the sterile edge (germinal mouth) becomes a coalesced tubular shaped grouping all entering the stigmatic cavity. From here they proceed to elongate through the moist loosely differentiated tissue which leads from the receptive area to the top of the ovaries enveloped in the stylar material.

There are ten stigmas (decagynous) in *hoya* fused into pentamerous pairs (or possibly 5 stigmas with split ends). At the outer corners (edge) of the pentagonal stylar table the fused stigmas form a short barely discernible groove. This is on the upper side of the receptive area. Secretions from this groove give rise to the retinaculum. The surface of the stigma upon which the retinaculum is formed belays a raised spongy, although structurally coherent, template of the retinaculum. At a very early stage of flower development, just after the pollinia are visible as gelatinous masses, the stigma begins to secrete the retinacular structure. I have arbitrarily termed this (Stage 2). At this time the upper surface of the retinaculum begins to form. The inner apical (head) portion is

continuous from secretion of the inner end (proximal) of the stigmatic groove. The two sides of the retinaculum are at first free and bisymmetrical, forming from lateral secretions of the stigmatic groove. This upper surface eventually fuses as maturation continues. The outer ends remain free and curve slightly outward from the median line. They also curve over the edge of the fused stigmas toward the underlying receptive area. The whole structure at first is pale brown and somewhat soft then becomes horny and dark brown, becoming very rigid. Gelatinous material in a semi-structured condition at the end of the twin extensions remains un-solidified.

As the corolla formation is completed and the flower is just ready to open (anthesis) the formation of the retinaculum is complete, and the pollinia are released from the anther envelopes (stage 4). At this stage the retinaculum is a three dimensional structure with a tubular cavity in from the outer (distal) apex, the lower surface of this channel (the under side of the retinaculum) is shorter than the upper (dorsal) surface with its projected extensions. This surface may be flat or slightly rounded. This lower surface thins as it reaches its rounded outer extremities. Through the top view on a microscope it appears as a rounded end of the retinaculum (the lower surface; end furthermost from the head). In addition to this central tube there are two side tubes, one on either side. Usually these side tubes are 45 degrees to the main axis and the central tube, but not connected to it. It is in these side tubes that the translator arms and caudicle are attached at the inner end. This allows for twisting and turning of the attached structures when the pollinarium is removed from its housing. The caudicle is attached above the translator. Both of the attached ends being tubular in shape, attached to the outer side of the wall forming the central retinacular tube.

The translators and caudicles are secreted at about the time the corolla begins to emerge from the surrounding calyx (Stage 3). They develop along the groove formed by the fused lower side of the anther, thus connecting the retinaculum to the pollinia. Each retinaculum has two translator arms and associated caudicles that connect to two pollinia each housed in (different) adjacent anthers. The clear sticky caudicle is supported by the translator. The translator is wedge shaped, conforming to the space between the anther and style, with its wider concave top supporting the caudicle. It is structurally more sound than the more fluid sticky caudicle. The latter in many cases is in the shape of a comma with the bulbous end into which the basal end of the pollinium adheres. Both of these parts of the pollinarium show individuality and differ widely among the various *hoya* species. I have never observed a *hoya* species lacking either structure. In some species the caudicle itself shows differentiation of its surface similar to that found in the translators, and also with some structural differentiation. The diversity presented, in the following photomicrographs, shows what a critical and important tool for taxonomic identity the pollinarium is. In herbaria material it is the one floral part that may remain intact without distortion or change. Upon soaking of the flower in the Kew solution (or boiling it up, not preferred) it can many times be removed for study intact.

At flower opening the pollinia are usually tightly affixed to the caudicle. As the flower ages this bond becomes less. In older flowers, while removing the retinaculum from a open flower, the pollinia may separate easily from the caudicle. On the following

pages I have tried to break the pollinarium development into stages and show photomicrographs related to each stage.

Dr. Rintz (The Peninsular Malaysian Species of *Hoya*) in The Malayan Nature Journal 30:1978, 10 divided pollinarium into four groupings. (1) Both caudicles and pollinia winged. (2) Only pollinia winged. (3) Neither caudicle nor pollinia winged, caudicles long. (Section *Eriostemma* now a Genus) (4) Neither caudicles nor pollinia winged, caudicles short. By winged he is referring to the sterile edge of the pollinia or the translator supporting the caudicle. I have found caudicles and translators on all the species I have photographed in his grouping (2). In addition there is a rudimentary (very short) sterile edge on the species *Hoya mitrata* Kerr (and also *Hoya darwini* Loher), his grouping (4). Of the pollinarium I have so far examined I have yet to find any without either a translator or caudicle as I define them. I feel either Dr. Rintz was using a low powered microscope or not studying the material in detail. It appears as far as the sterile edge is concerned the Section Rudimentalia Kloppenburg species represent a near loss (or beginning) of this structure among *Hoya* species.

In discerning the caudicle, since in most cases it is a clear almost transparent structure, it may be necessary to check closely at different focal planes in order to detect its presence. It is in some cases below the more opaque translator and thus hidden. I have found the use of dye helpful in differentiating these complex structures and especially useful in photographing parts that are all of the same color but different consistencies.

Corona of a Hoya Flower

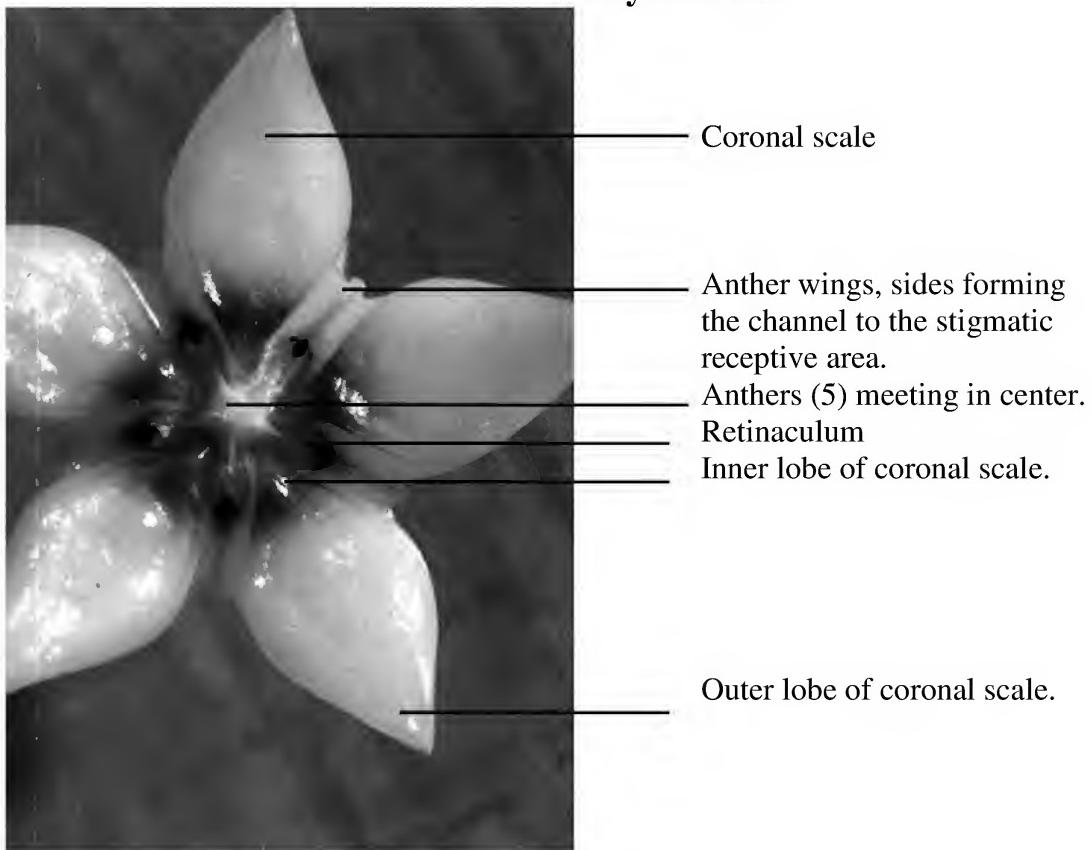
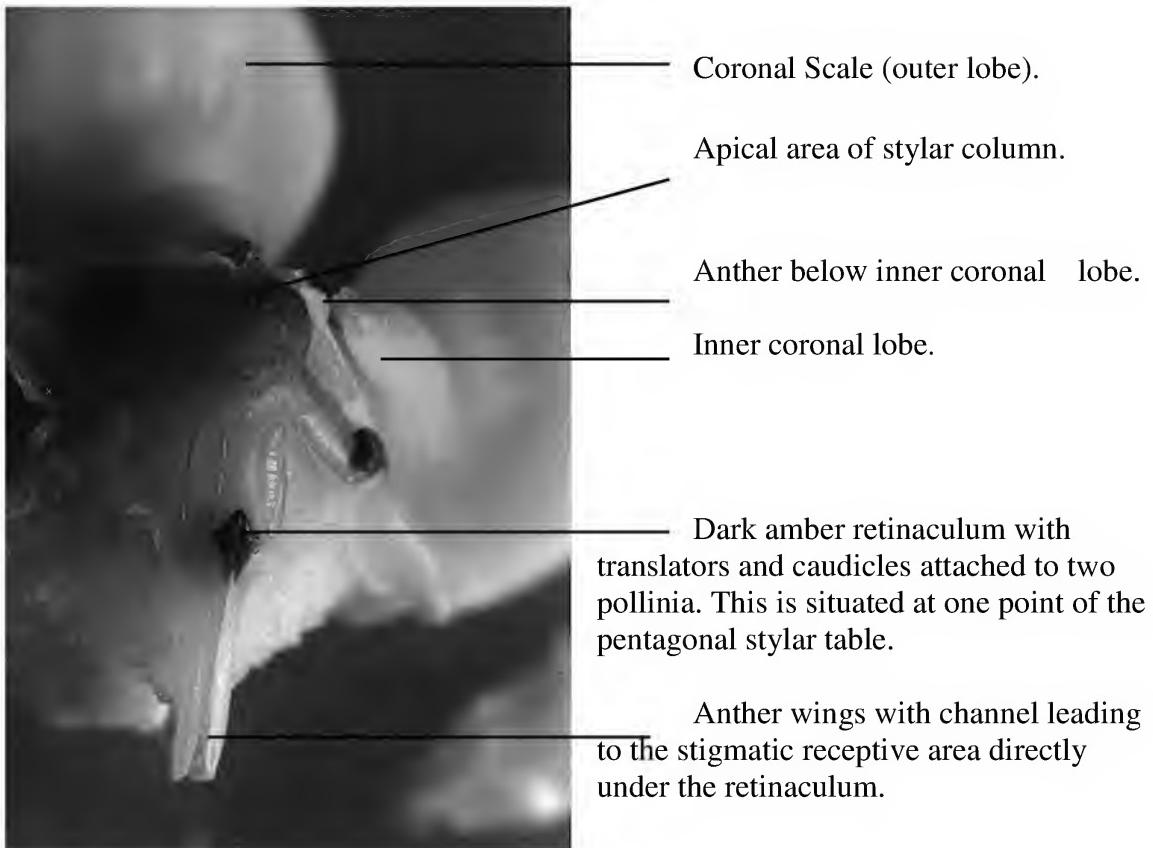


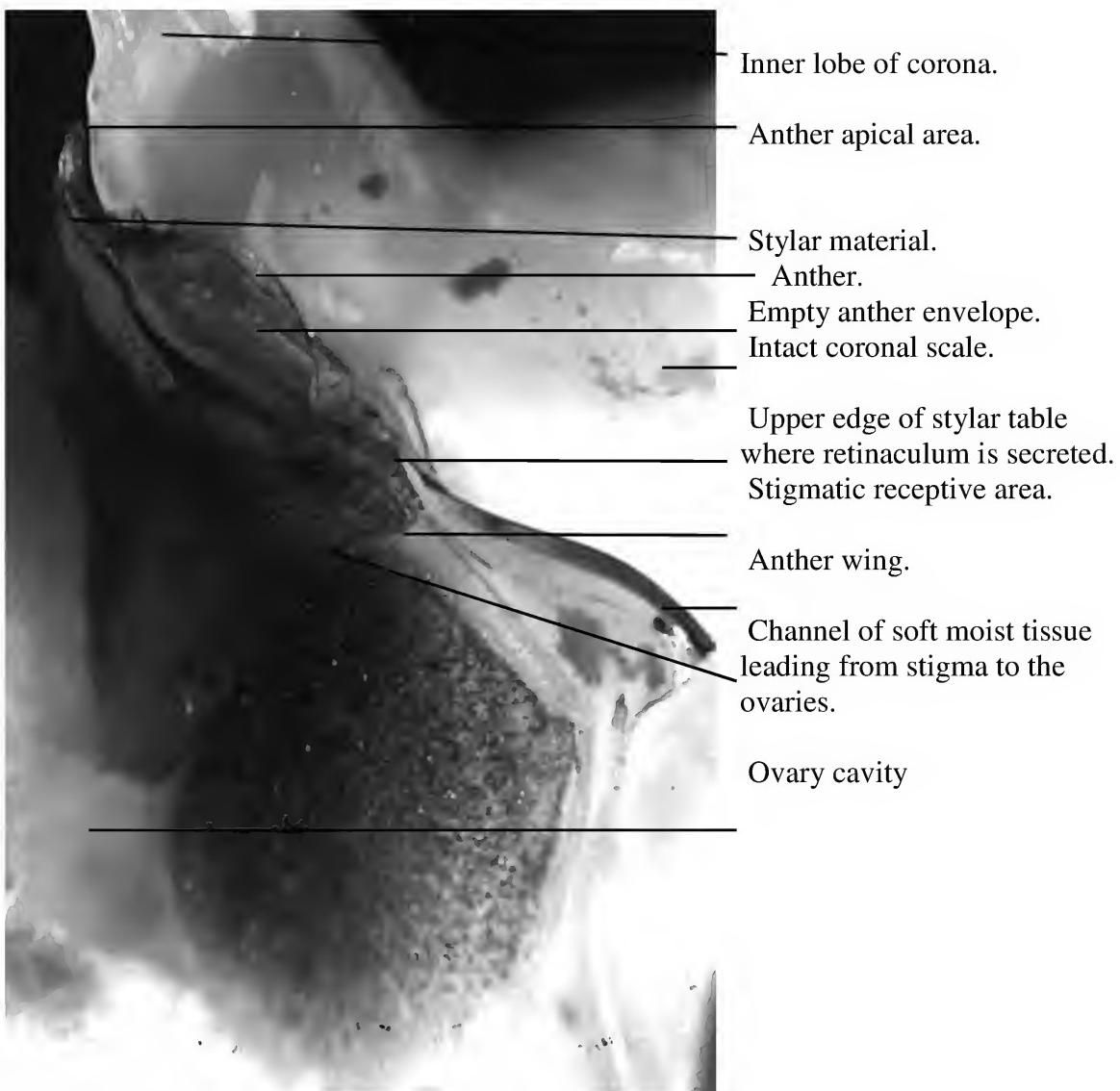
Photo of hoyo flower crown (corona), a top view magnified approximately 15 times.

Stylar Table of the Hoya Flower



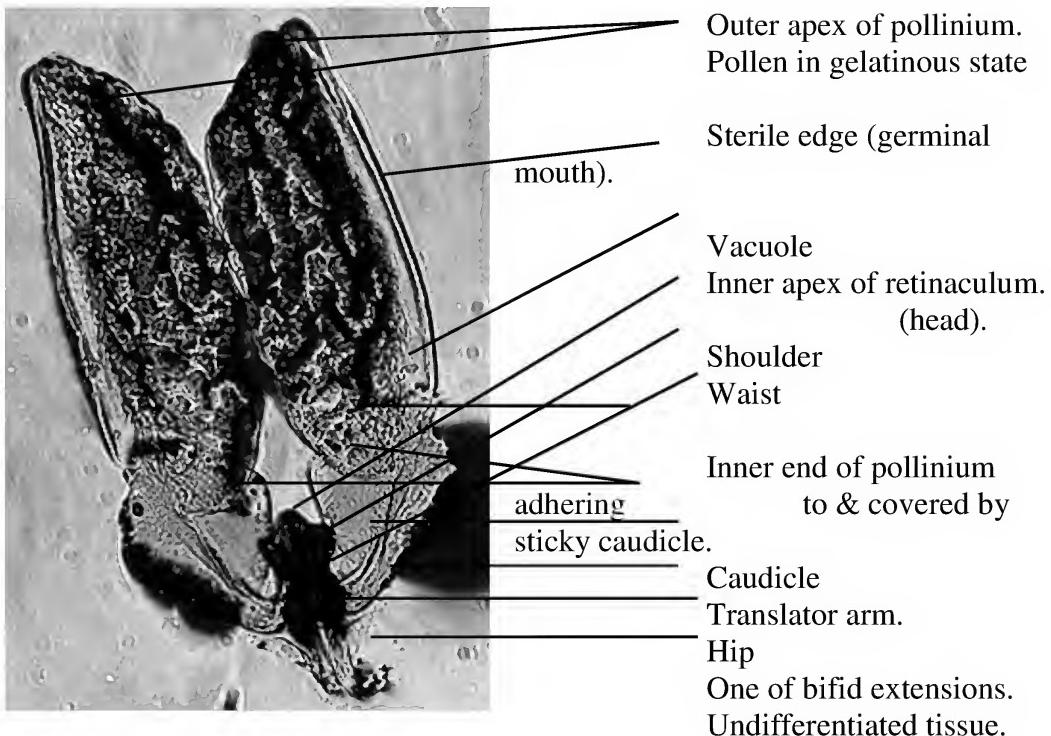
Picture of a *hoya* pentagonal stylar table. Three coronal scales and the underlying anthers have been removed to show the relative position of the pollinarium. Two scales remain, one at the right side and one above. Magnified approximately 45 times.

Coronal Section



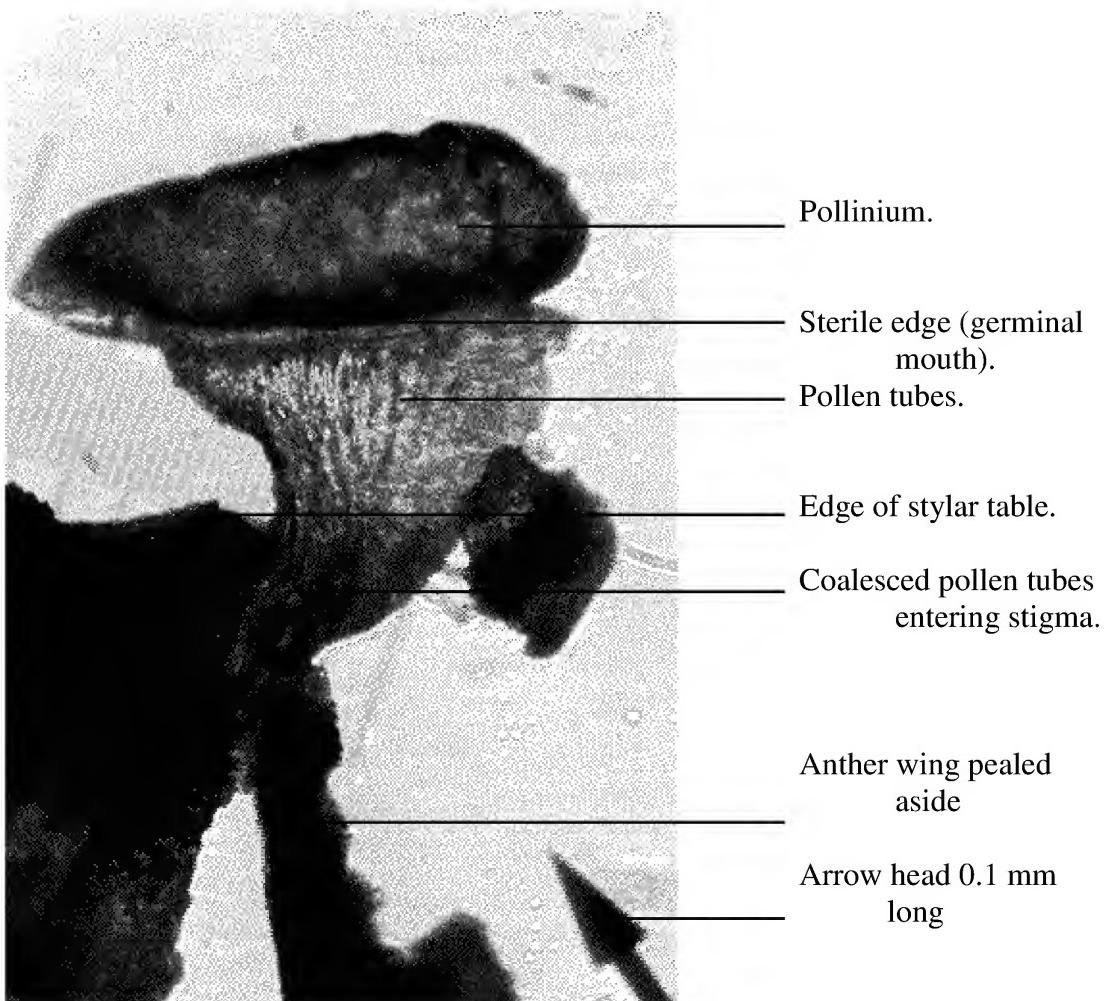
Section between the anther wings of a flower of *Hoya obtusifolia* Wight, magnified approximately 16x. Section stained to bring out structural detail. Showing anther with one empty anther envelope, above which is one intact coronal scale. Below the anther the stylar material has been sectioned cutting through the fused stigma, with the stigma receptive cavity visible at the end of the groove flanked on the right side by one rigid anther wing. Leading from the stigma the channel of spongy material is visible through which pollen tubes would travel if fertilization were to occur. Hollow ovary cavity is visible and labeled above.

The Hoya Pollinarium



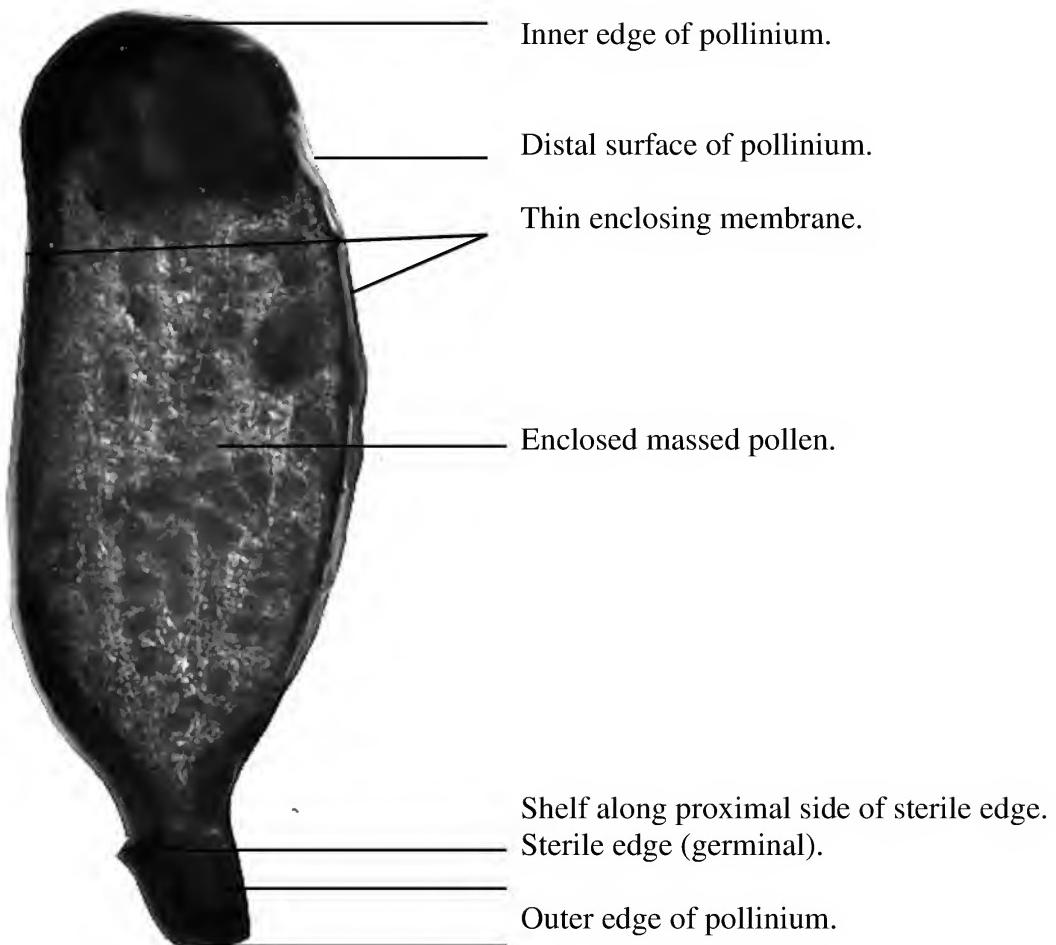
A photo of a hoya pollinarium magnified approximately 165 times.

Pollinium Germination



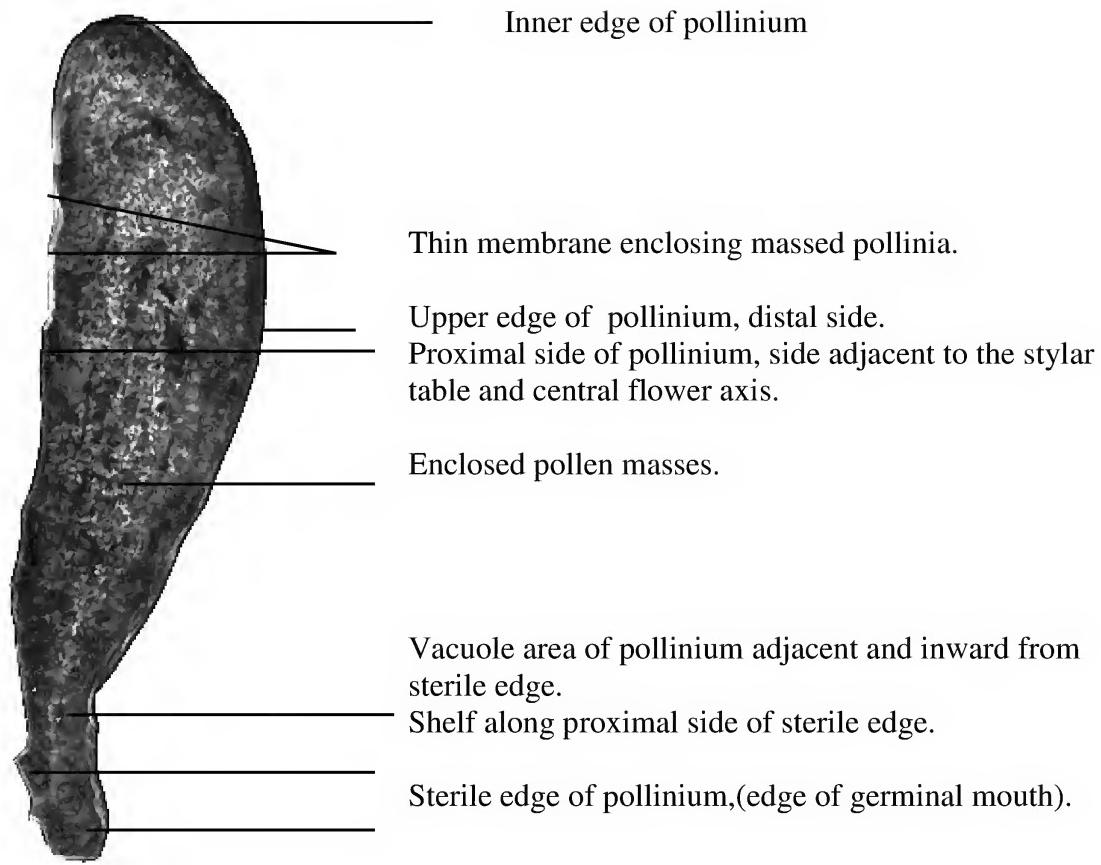
Pollinia magnified approximately 165x showing pollen tubes emerging from sterile pellucid edge (germinal mouth). Tubes coalesce into a tube entering the receptive stigmatic area under where the retinaculum is secreted. Scales and sections removed to photograph this germination.

Cross Sections of Pollinia



Magnified approximately 165x.

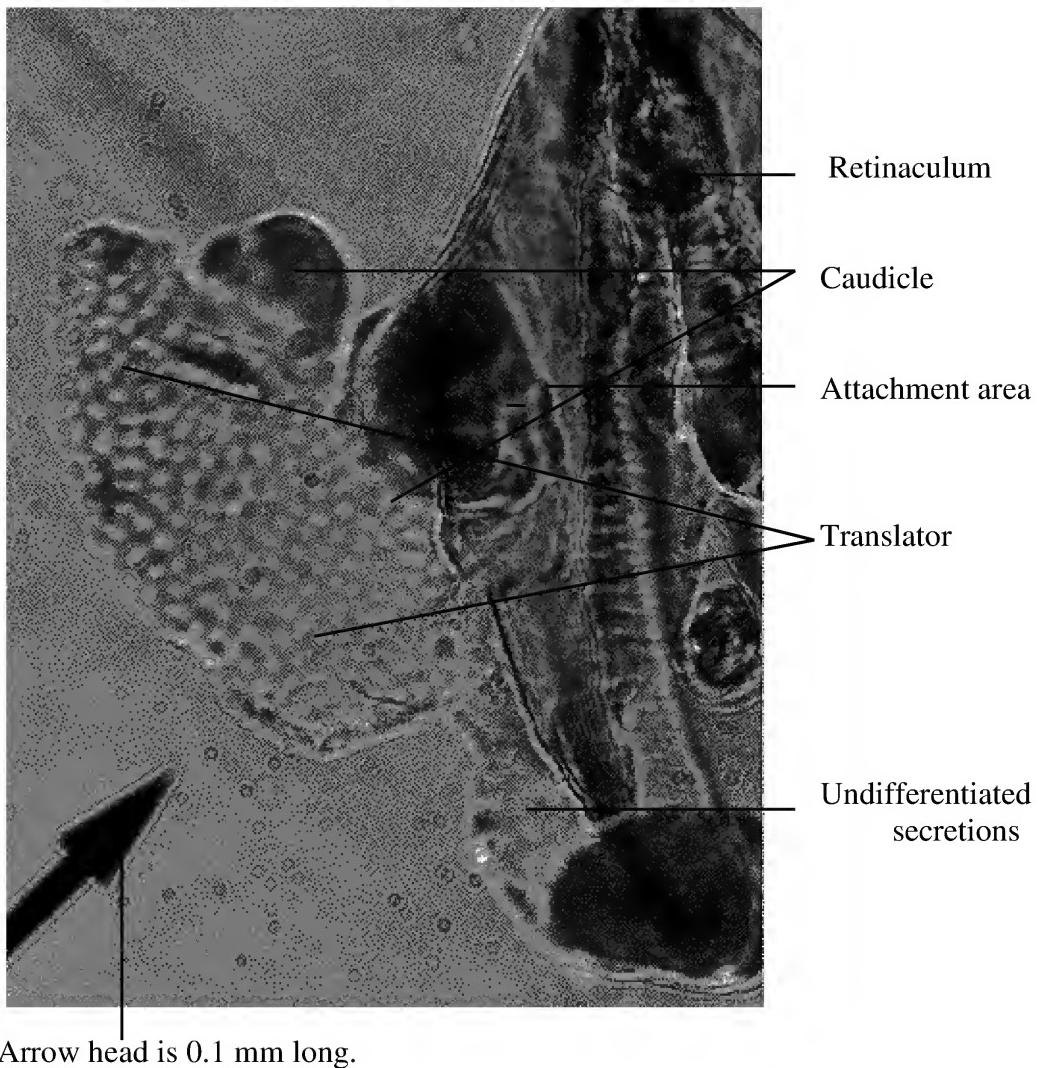
Pollinia from flower of *Hoya obtusifolia* Wight, clone with white corona via CT.
Thailand.



Magnified approximately 165x.

Pollinium from flower of *Hoya imperialis* Lindley, clone via Ted Green from Palawan Island, Philippines. Cross section. Note the difference of the proximal edge of the pellucid edge in this species and the one of *Hoya obtusifolia* shown on page 11.

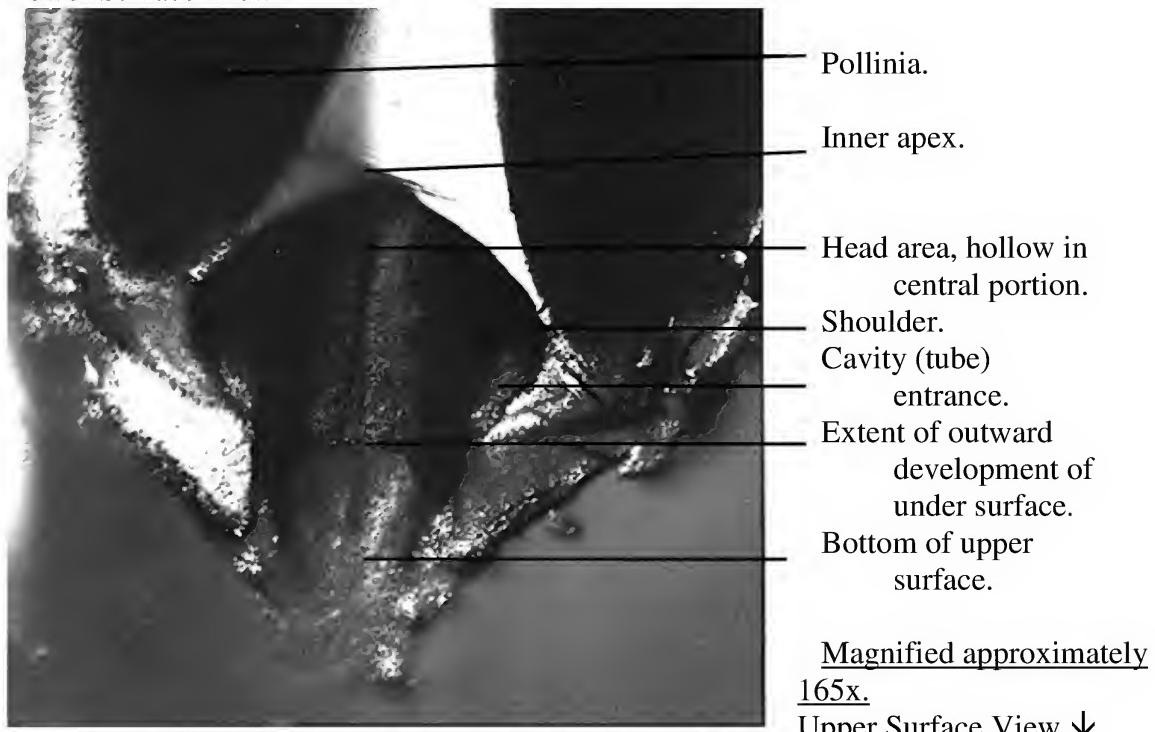
Translator and Caudicle Development



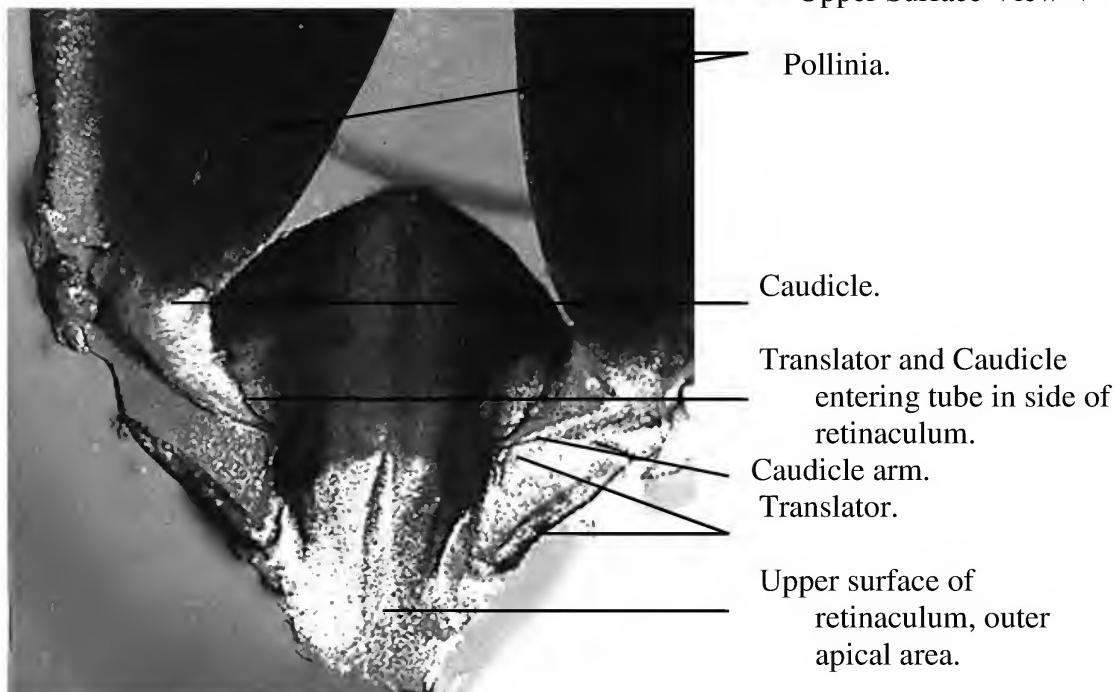
Magnified over 660x. At this stage of development on the pollinaria the bud of the Hoya flower is covered over 1/2 by the calyx. The translator is more completely developed at this time than is the caudicle, which at this early stage is not yet in contact with the pollinium. The pollinium is still enclosed in the anther envelope. The caudicle and translator are attached inside the retinaculum in a tunnel entering the side at approximately a 45 degree angle extending upward under the broadened shoulder of the retinaculum.

**Upper and Lower surfaces of the Retinaculum
from *Hoya imperialis* Lindley, clone from Palawan, Philippines via Ted Green.**

Lower Surface View ↓



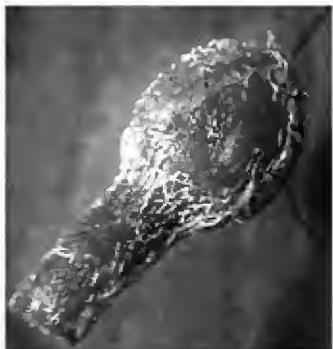
Upper Surface View ↓



Magnifier approximately 165x.

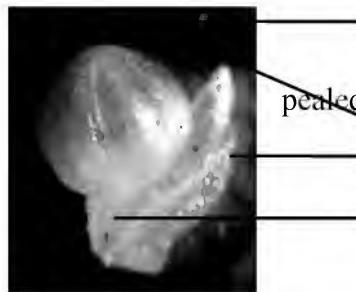
Pollinarium Development Stages

Stage 1: *Hoya kerrii* Craib.



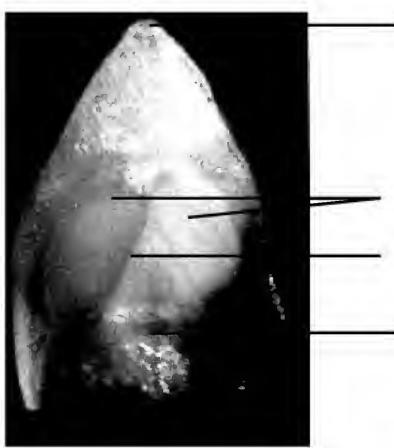
In the very early flower bud stage, prior to any secretion of retinacular structure, the two pollen masses are present in the anther envelopes. At this time they are not yellow but rather pale cream colored. The anther and stylar table are structurally visible. At this stage no coronal development is visible.

Tight bud stage, 0.34 cm. long x 0.23 cm. widest.



Outer surface of anthers with calyx and corolla peeled back.
Corolla loosened from bud.
Sepal of calyx peeled back from bud.
Pedicel.

Same bud as above approximately 16X magnification.

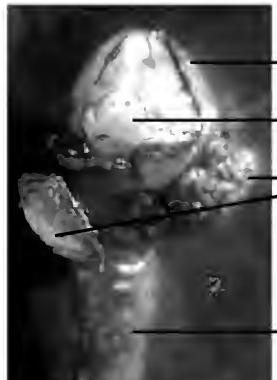


Anther inner apex, proximal surface.
Pollinia within anther sacks (envelopes)
Side where germinal mouth (sterile edge) forms.
Area of attachment to the edge of the stylar table.

Stage 2:

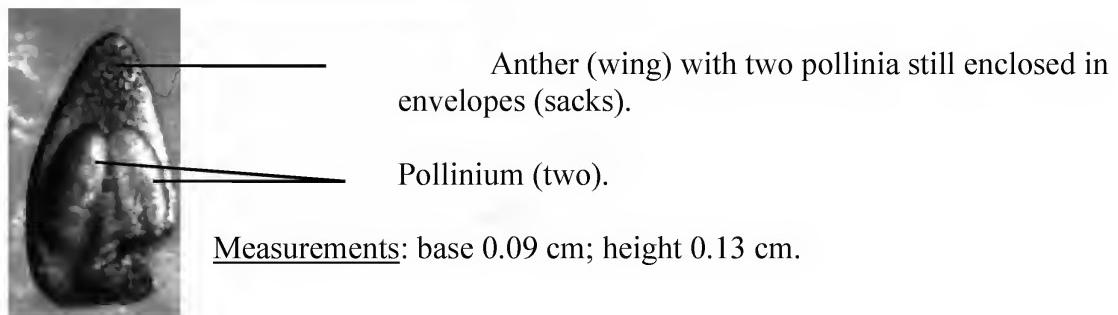
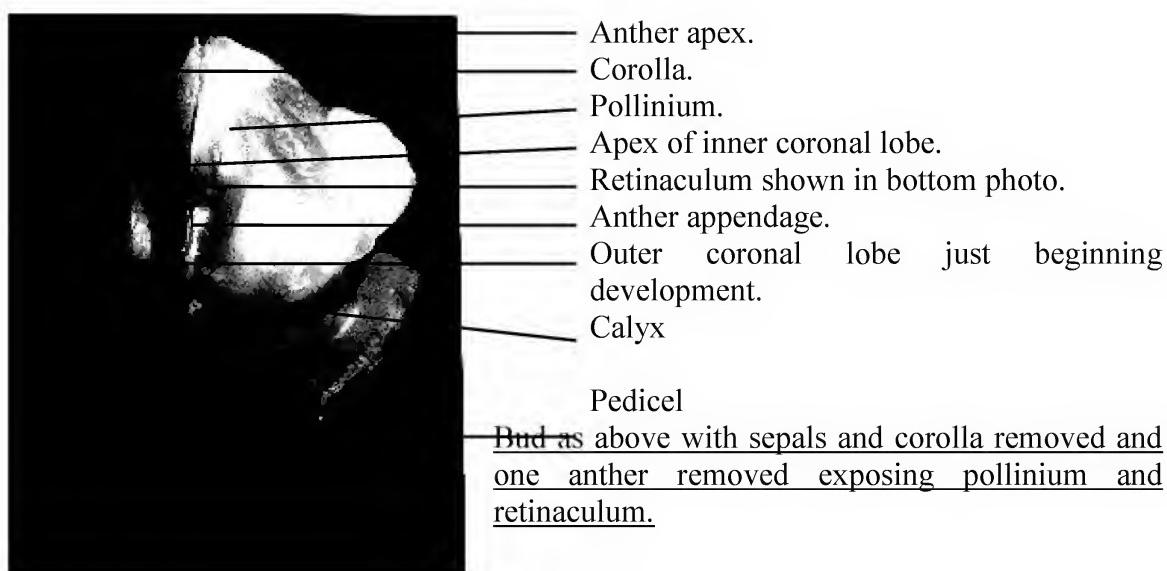
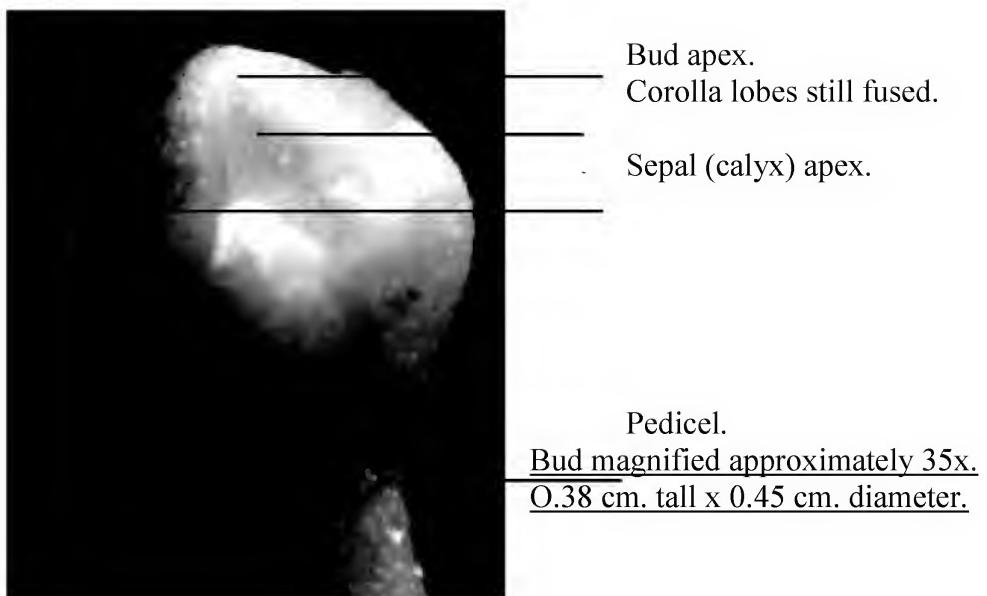


The first visible presence of a retinaculum begins just as the bud begins to swell and the apex of the corolla begins to protrude above the calyx. The upper surface of the retinaculum is secreted first and at this early stage is only present as two thin slivers of darkened tissue connected at the inner end. The translators and caudicle are not present. The pollinia have further enlarged and have become pale yellow in color. In addition the crown has begun to develop (although still colorless).



Anther magnified approximately 16x, with calyx and corolla removed or peeled back. Stained to enhance detail.

Stage 3: Parts shown are from *H. kerrii* Craib.





By the time the bud swells to where the calyx reaches approximately half way to the bud apex the retinaculum appears as shown in this photomicrograph magnified approximately 160x. Here the translators are developing but not fully formed. The caudicle is just starting to develop (the bulbous end that eventually envelopes the lower end of the pollinia). In addition the retinacular lower surface has not been fully secreted by the fused stigmas.

Stage 4: At the time the flower is beginning to open the pollinia are released from the anther envelopes and adhere to the gelatinous sticky caudicle. The caudicle in turn is supported by the triangular (wedge shaped) translator arm which lies in the groove where the anther adheres to the edge of the stylar table.

Terminology

Excerpts from Historical Usage's of Terms Pertaining to Hoya Pollinarium

Over time, various terms have been used for the different parts of the male reproductive structures. See my labeled photo page 9 of the parts involved.

The oldest reference I have is Vahl's 1810 use of the term "***corpusculi***" for the secreted central holder. Vahl applied this term in the description of the species *Sperlingia verticillata*, now determined to be *Hoya verticillata* (Vahl) G. Don. I would assume on the basis of priority alone, this term would be the most appropriate to use, however priority does not necessarily apply in such cases. I had preferred and used the term "***retinaculum***", much used by Schlechter, and others. This latter term was also used by Blume in Rumphia IV 1848.

In regard to the pollen which is in coherent masses the designation "***massae pollinis***" was applied in 1811:84 in Anton's Hortus Kewensis and repeated by many subsequent authors (in Latin or English) up to the present time. The secreted connection of the pollen masses and the corpusculum has gone by various names. It was King and Gamble in 1901:559 (Flora of the Malay Penn.) who said "attached by caudicles of various shapes". In reality the pollinia are attached at their base by a sticky, usually clear gelatinous mass, best termed a "***caudicle***". It must be noted this structure may be fused to the underlying structure and barely visible. This structure is supported in many cases by a more rigid wedge shaped structure that I have labeled a translator or translator arm (not originated by me). It is the upper slightly concave surface that supports the caudicle in most cases.

The term **translators** appears in Perkins (*Fragmentia Fl. Philipp.*) by Schlechter & Warburg. It is repeatedly used in many German descriptions i.e. Wettstein, Schumann & Lauterbach et al.

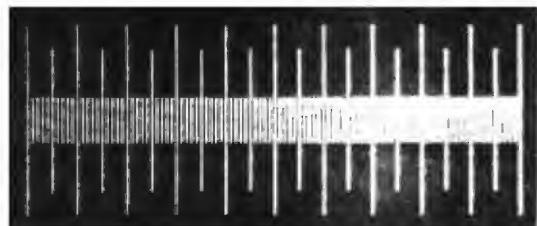
Confusion as to what is referred to by the use of “*pollinia*” for the structure enclosing the pollen but also used for the whole male structure is unfortunate. Forster and Liddle have used the term “*pollinaria*” for the whole structure 1990 in “A checklist for the Genus *Hoya* R. Br. (Asclepiadaceae) in Papuasia”. As far as I can determine this term was used by Lynch 1977 for descriptions in the Genus *Asclepias*.

The following is an attempt to put into dated sequence the use of the various terms in regards *hoya*:

- 1810 “*Germinia duo sub centro corpusculi*” 114 **Vahl**: in Gkrivter af Naturhistorie-Gelskabet.
- 1811 “*Massae Pollinis...*” 84 in **Aiton’s** Hortus Kewensis.
- 1825 “*Massae pollinis*” 1062 **Blume**: in Bijdagen tot de Flora van Nederlandsche Indie.
- 1837 “*pollen masses* fixed by the base,” 125 and “*pollen masses* erect, fixed by the base to the back of the *corpuscles*” 128 in **G. Don** General Sys. of Gardening and Botany.
- 1844 “*Massae pollinis* erectae, approximatae, ad *corpusculi* dorsum basi affixae” 663 et al, and “*saepius margine pellucidae*” 634 in **Decandolle**, Prodramus Sys, Veg..
- 1848 “*Massae pollinis...*” 310 in Fleur des Serres. VI
- 1848 “*Pollinia basi affixa*” and “*Retinacula minutissimapollinia basi affixa*” et al 50 and *Retinacula emarginaturis stigmatis.....Pollinia clavatacornibus retinaculi affixa.*” 51 **Blume**: in Rumphia IV.
- 1852 “*Pollinia basi affixa....*” 64 **Walpers**: in Annales Botanices Systematicae.
- 1865 “*Massae pollinis ...*” 159 **Muller**: in Fragmenta Phytographiae.
- 1883 “*pollen- masses* 2 to each anther,..” 319 **Bailey**: in Synopsis of the Queensland Flora.
- 1883 “*pollen-masses* various” 52 **Hooker**: in Flora of British India.
- 1895 “*pollen masses*” 162 **Trimen**: in Handbook of the Flora of Ceylon.
- 1901 “*pollen-masses* 1 in each anther call, erect, waxy, usually flattened, often thickened on the outer margin, attached by *caudicles* of various shapes,to the horny hard *pollen carriers.*” 559 et al **King & Gamble**: in Jour. of the Royal Asiatic Soc., Bengal Branch. A lot of attention has been given in their species descriptions to variations in the *caudicles* e.g. conical “*pollen carriers*” and “*cup-like caudicles.*”
- 1902 “*pollen masses waxy*” 320 **Collett & Hemsley** in Flora Simlensis.
- 1903 “*Pollinia basi affixa*” 478 et all in Plantae Hochruthinerae.
- 1904 “*polliniis compressis oblique oblongis, translatoribus prebrevibus diatis, retinaculo ...*” 131 et al and “*caudicululis ...*” 133 **Schlechter & Warburg**: in Fragmentia Florae Philippines.

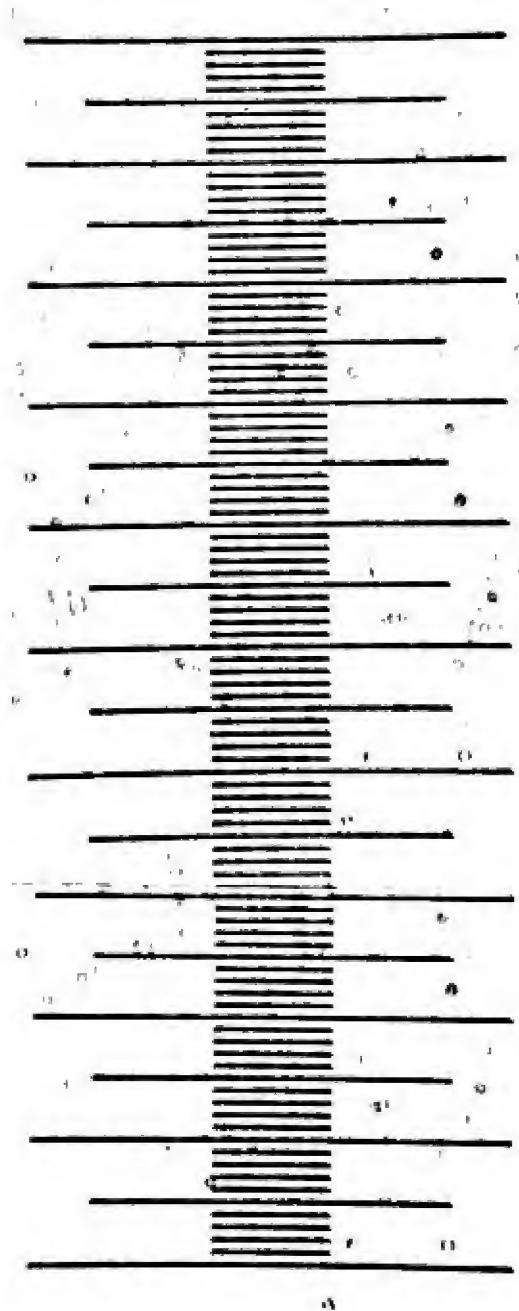
- 1905 “*polliniis oblique oblongis, translatoribus brevibus, retinaculo rhomboideo....*” 362 et al **Schumann & Lauterbach:** in Nachtrage Zur Flora der Deutschen Schutzgebieten.
- 1911 “*Pollinien. Translatoren mit klemmkorpern.*” 450 **Wettstein:** in Handbook Sys. Botanik.
- 1912 “*masses polliniques oblongues, attachees par des caudicules en coupe a un retinacule ...*” 9 et al **LeConte:** in Flore Gen. De L Indo-chine.
- 1912 “*pollen-masses 1 in each cell.*” 380 **Merrill:** in A Flora of Manila.
- 1920 “*pollinium solitary..*” **Fyson:** in Flora of the Nilgiri & Pulney Hill Tops.
- 1922 “*Pollinia 1 in each cell,*” 561 **Haines:** in Botany of Bihar & Orissa.
- 1923 “*pollen in waxy masses*” 208 **Parkinson:** in A Flora of the Andaman Islands.
- 1923 “*pollen masses erectattached by distince caudicles to the horny pollen carriers*” 848 **Gamble:** in Flora of the Presidency of Madras.
- 1923 “*Pollinia single, waxy with short thick caudicles.*” 394 **Ridley:** in Flora of The Malay Penn.
- 1956 “*pollen masses.... corpuscula cornea ...*” 462 **Henry:** in Journal Bombay Natural History Society 75.
- 1960 “*Pollinia erect from dark horny corpuscula....*” **Pham-Huong:** Flora du Vietnam.
- 1965 “*pollinia solitary*” 751 **Ohwi:** in Flora of Japan.
- 1965 “*pollinium solitary in each anther cell, erect, often pellucid-margined on one side*” 266 **Backer** in Flora of Java.
- 1973 “*pollen -masses.....*” 50 in **Huber:** A Revised Handbook of the Flora of Ceylon.
- 1974 “*polliniis in quoque loculo solitariis..... caudiculis erectis brevissimis, retinaculo oblongo,.....*” 126 **Tsang & Li:** in Acta Phytotaxonomica 12 #1.
- 1976 “*Pollinia erect from dark horny corpuscula, 2 anther, waxy without pellucid margins.*” 449 **Saldanha & Nicholson:** in Flora of Hassan Dist. Karnataka India.
- 1978 “*Twin-Pollinia* “both *pollinia* and *caudicles* are winged with *caudicle* wings being very broad” 475 and “*pollen masses* known as *pollinia*: by secretions of the stigma which produce the *caudicle* and *corpuscule*” **Rintz:** in Malay Nature Journal.
- 1984 “*pollinia marginem pellucida...., caudiculis brevibus..., retinacula elliptico...*” 119 **Li:** in Bull. of Botanical Research IV.
- 1990 “large *pollinarium*: 5 **Forster & Liddle:** A Checklist for the Genus Hoya R. Br. (Asclepiadaceae) in Papuasia.
- 1992 “*pollen in pollinia.*” 596 in Royal Hort. Soc. Dictionary of Gardening 2.
- 1992 “*Pollinarium 1.3-1.4 mm long , 1.2-1.3 mm wide; pollinia oblong, 1.12-1.15 mm long, 0.35-0.42 mm wide, with pellucid germination mouth on outer edge; corpusculum ovate, 0.8-0.9 mm long, 0.55-0.58 mm wide; caudicles 0.30-0.35 mm long,*” 629 et al **Forster & Liddle:** in Austrobaileya 3(4): 627-641.

Measuring Gauge
100 micron (1 mm) scale imbedded in slide.



Magnified 65 times.

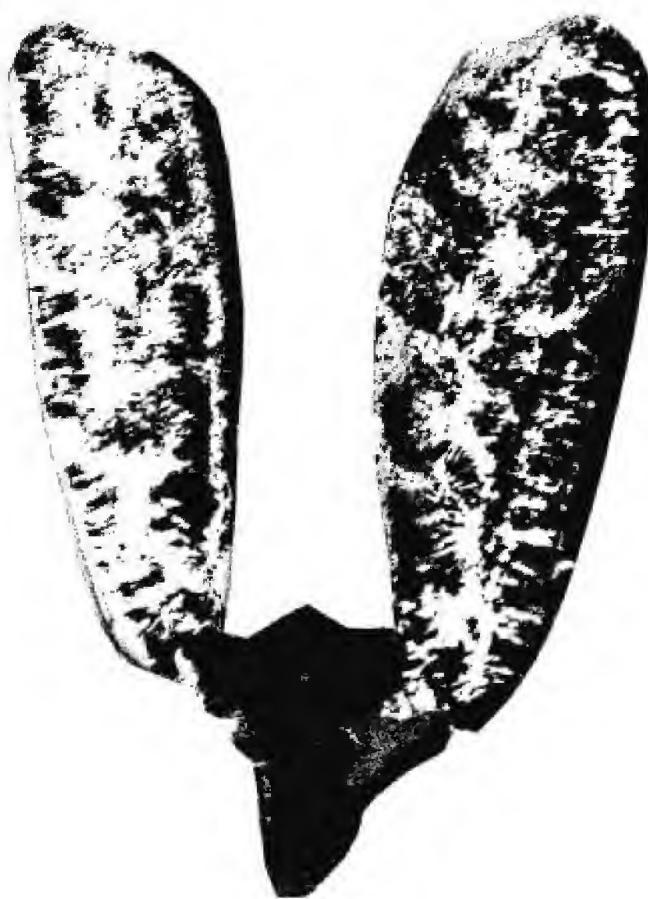
The above type magnified scale, and the one on the following page, were used in measuring the pollinaria features in this study. The scale is one millimeter long, divided into 100 segments, on a microscope slide covered with a cover slip. Measurements can be made direct at the time of viewing, or of the enlarged photos.



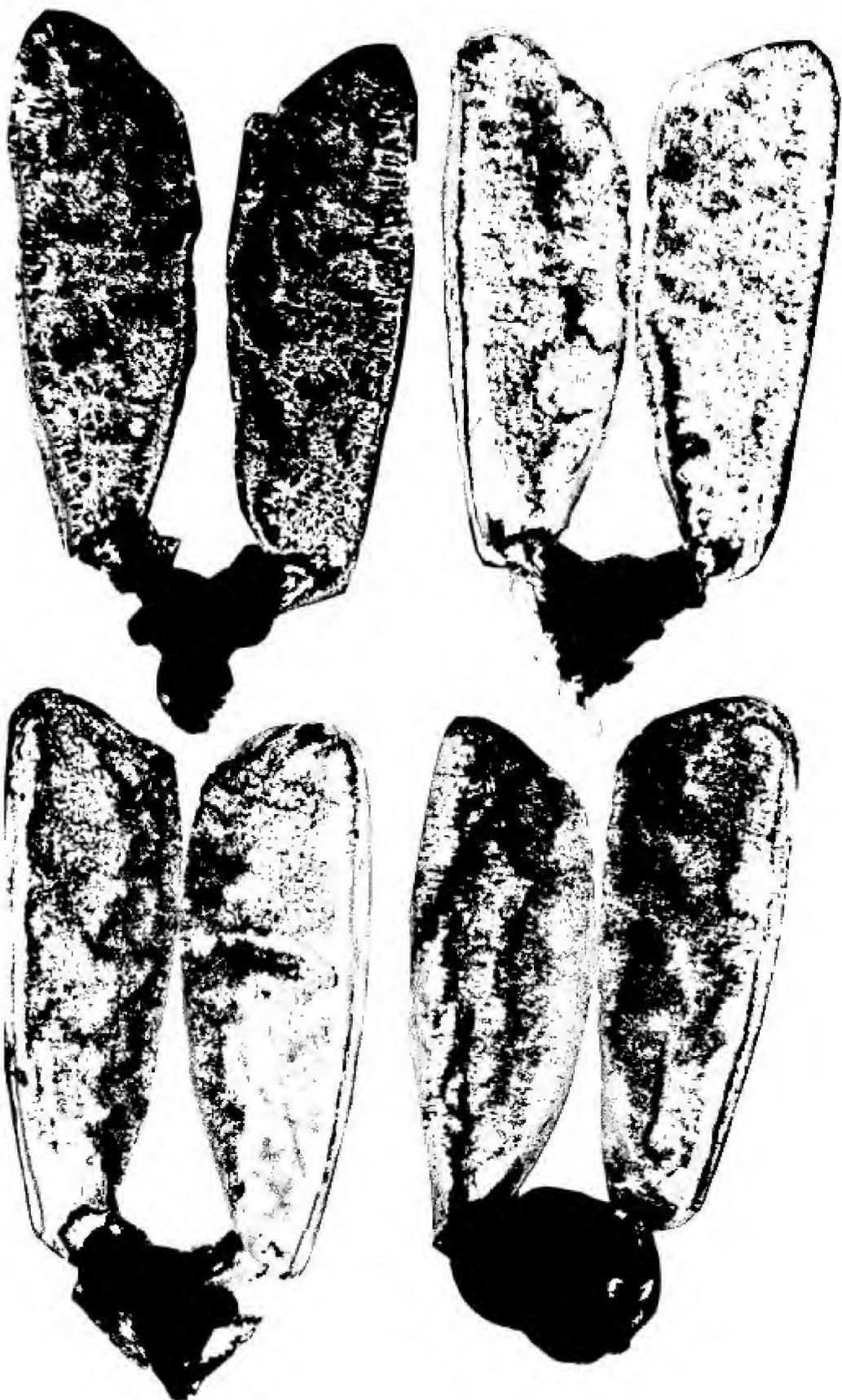
One millimeter scale magnified 165 times.

***Hoya kerrii* Craib 1911**
 The five pollinarium from one flower.

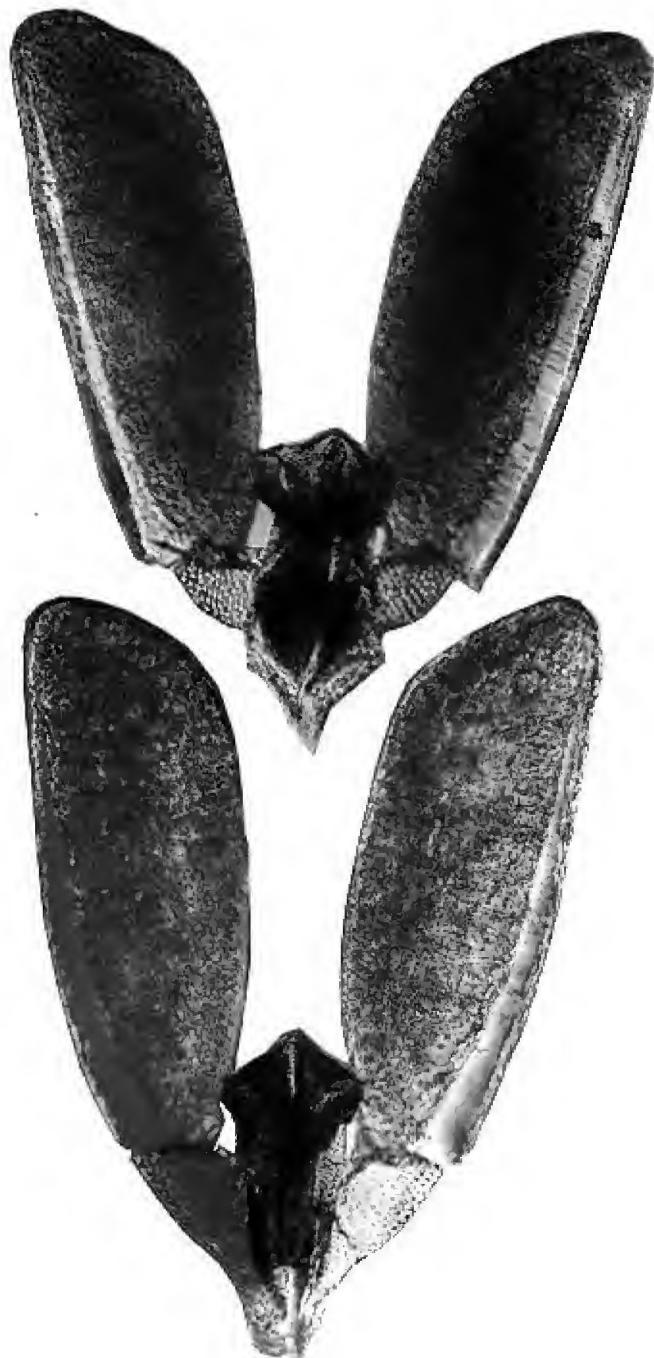
#	Length			(Pollinium)			Width		
	<u>Right</u>	<u>Left</u>	<u>Difference</u>	<u>Right</u>	<u>Left</u>	<u>Difference</u>	<u>Right</u>	<u>Left</u>	<u>Difference</u>
1	0.57 mm	0.57 mm	0.00 mm	0.19 mm	0.19 mm	0.00 mm			
2	0.58 mm	0.59 mm	0.01 mm	0.19 mm	0.19 mm	0.00 mm			
3	0.56 mm	0.56 mm	0.00 mm	0.19 mm	0.19 mm	0.00 mm			
4	0.57 mm	0.59 mm	0.02 mm	0.19 mm	0.19 mm	0.00 mm			
5	0.59 mm	0.55 mm	0.04 mm	0.20 mm	0.16 mm	0.04 mm			



All pollinium here magnified approximately 160x. Above is pollinium #5. On the following page arranger left to right top to bottom is #1, #2, #3 and #4. There is as to be expected some slight differences in development of the various parts giving rise to different measurements. In addition differences in focal depth and positioning of parts after removal from the flower also may contribute to some differences.



Comparison of Pollinaria
Hoya merrillii Schltr., flowering's of five (5) different years at Fresno, Calif..



approximately 165x.

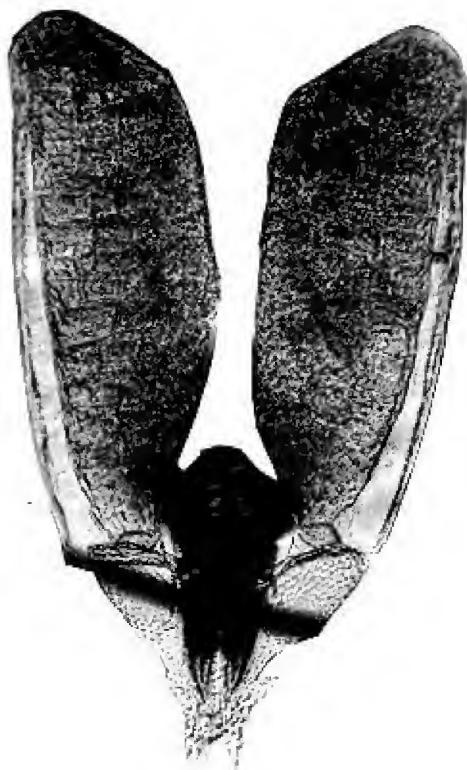
Pollinaria magnified



1992 flowering.

1993 flowering

Pollinaria magnified approximately 165x.



1994 flowering.

Pollinaria magnified approximately 165x.

There appears to be slight variations in the pollinaria of one clone flowered in different years. Some variation in photos results from the focal plane selected. The thickest structure, the retinaculum, gives the most difficulty since the head may rise above the plane of the pollinia. This difference gives rise to photos that appear different but are actually views of different depths on the same object. I was surprised at minimal variation when the results of this study was completed and assembled. There is always variation in the amount of undifferentiated material clinging to the outer apical area of the retinaculum and sometimes along the translators.

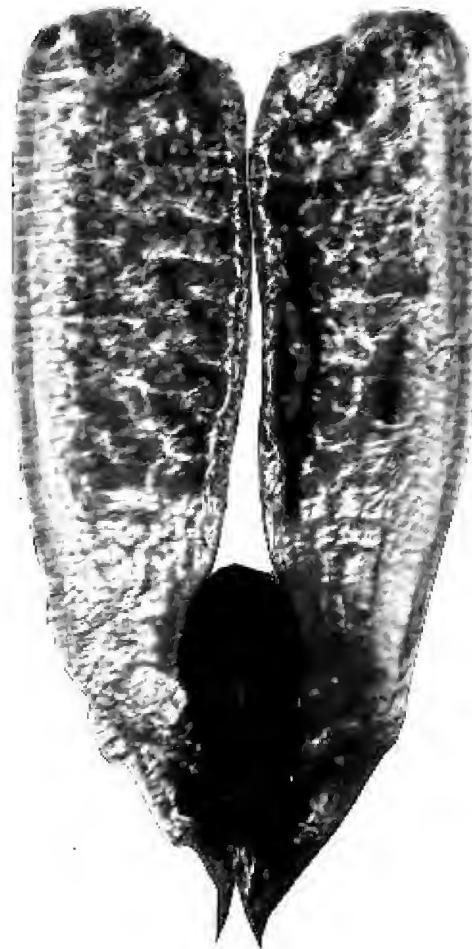
Comparison of Pollinaria
Hoya sp. 80-03, flowered at three (3) different locations.



Flowered at Kaaawa, Hawaii

Flowered at Fresno, Calif..

Pollinaria magnified approximately 165x.



Flowered in Central Point, Oregon.

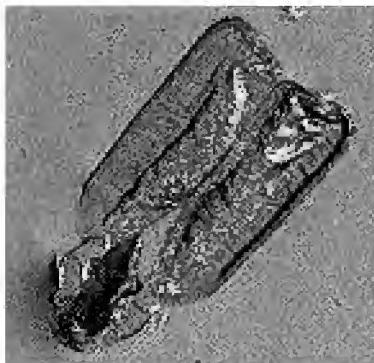
Magnified approximately 165x.

The pollinia flowered at different locations show slight variation, but are recognizable as form the same species. The pollinia on the right (Fresno flowering) appears shorter but is the result of being skewed toward the outer apex slightly. As with flowerings of different years most variation shown here is the result of focal plane choice. It actually takes a number of photos to determine precisely the variations involved.

Pollinaria Deliniations for 2017

The following photos will help explain the different classifications listed in the 2017 deliniations of pollinaria in the genus HOYA, I have tried to include all the ones I have worked on incluring many still unpublished mostly because of not being able to get holotype sheets made.

Pollinia inner apex types Numbers as in Philippine Key



224) Pollinia inner apex truncate. “S”



225) Pollinia inner apex rounded “R”



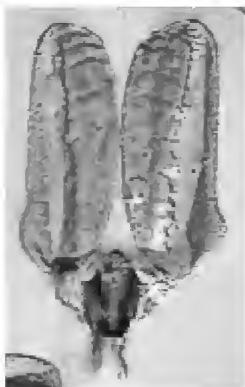
226) Pollinia inner apex tapered centrally (inward) “T”



227) pollinia inner ends tapering inward with flat surfaces “F”



228) Pollinia inner apices of two types one rounded “R” and one tapered “T”



229) pollinia external base expanded outward. “FL”

Pollinia Translator Types & Pollinia Caudicle Type

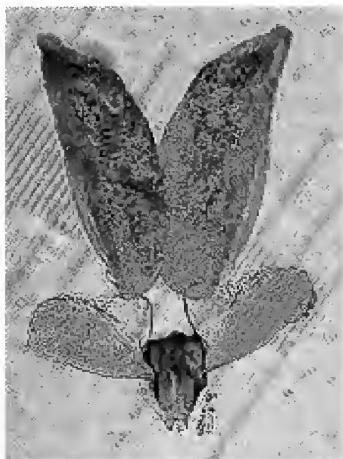


178) Translator type (ls).



179) Translator linear but modified a little beyond pollinia end. **I/cw or I/o**

Note: there are other structural differences especially of the retinacula that need to be delineated.

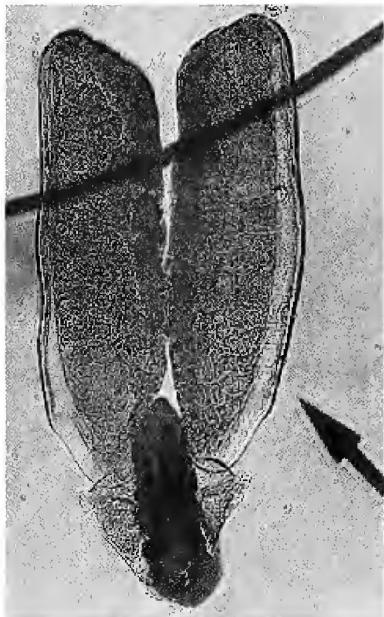


180) Translators fiddle shaped more like drumsticks.
(fb)

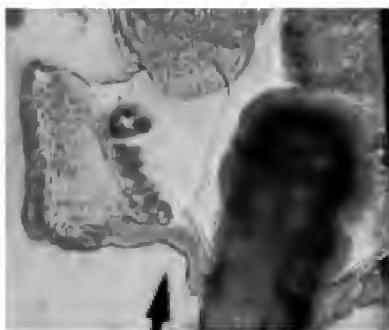
230) Caudicles clear **(C)**



181) Translators perpendicular to the retinaculum.
(p)



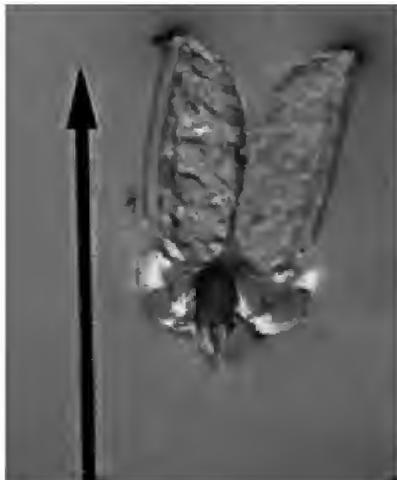
182) Translators delta shaped with flat top.
(d)



183). Translators end squared off.
(t)



184). Caudicle a small ball.
(o)



185) Caudicle with wide end funnel shaped.
(ew)

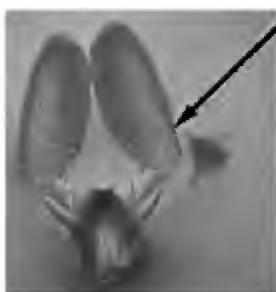


230) Caudicles with clear surfaces.

231) Caudicle surface granulate etc. not clear (G)



232) Translators with spreading base, expansive.(f)

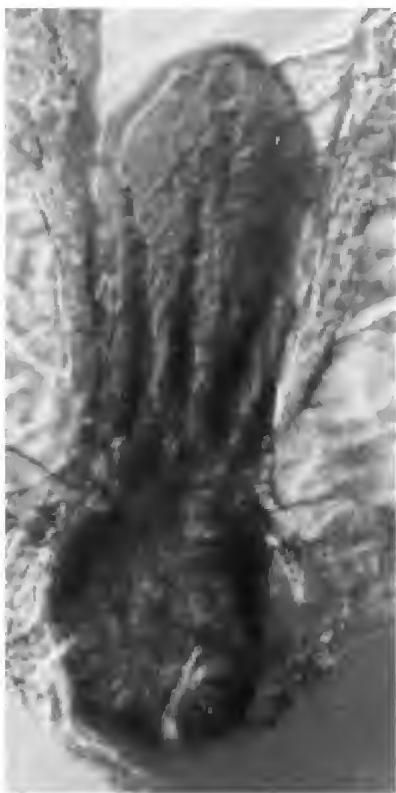


233) Caudicles rectangular with some dorsal modifications/ otherwise. (r)



Caudicle with **cupped** upper end.

Pollinaria Retinacula Type



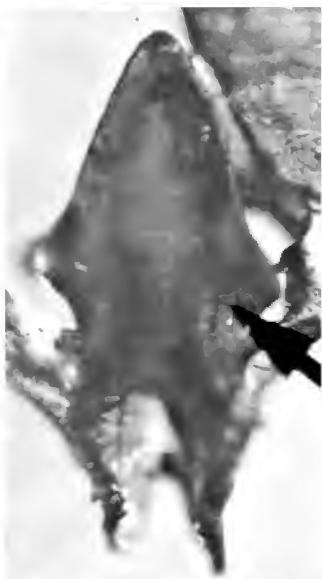
236) Retinaculum elongate, long & narrow. **E**



237) Retinaculum shield shaped
(head, shoulders, waist, hip & legs). **S**



238) Retinaculum shield shaped, head dome shaped.
Shoulders round . **R**



239) Retinaculum shield shaped, head elongated. **HE**



Retinacula with long shoulders **LS**



242) Retinaculum round legs hidden. **LH**



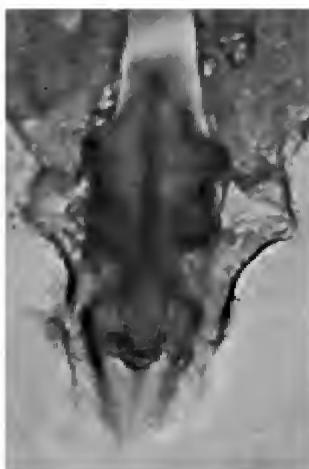
243) Retinaculum round legs showing. **LN**



244) Retinaculum with shoulder ends up (hands up). **HU**



246) retinacula with horns on the head. **HH**

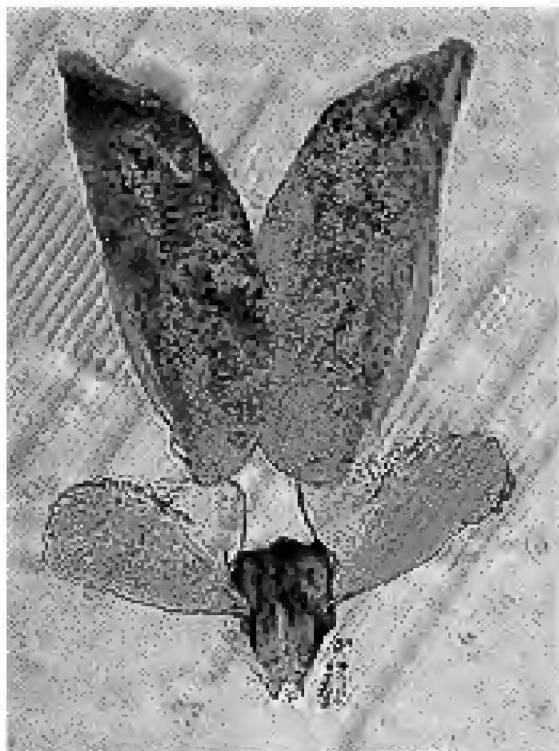
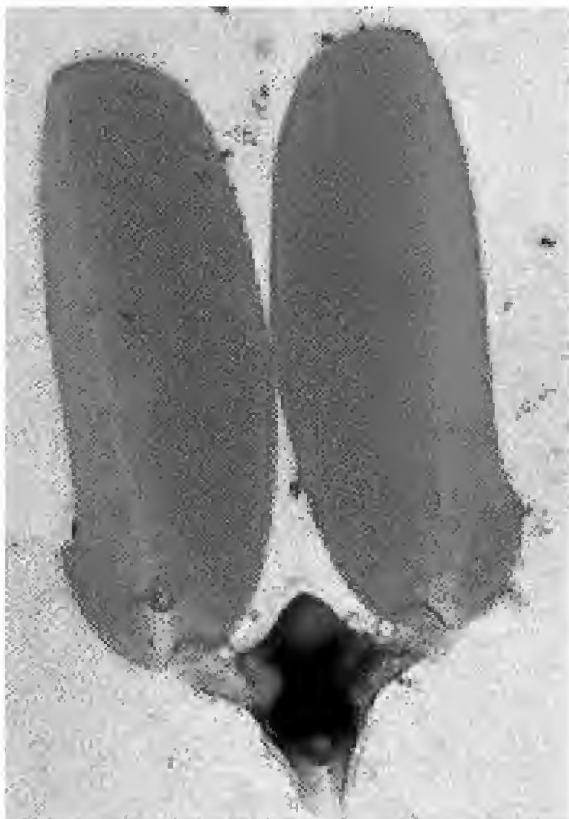


Two Shoulders **2S**

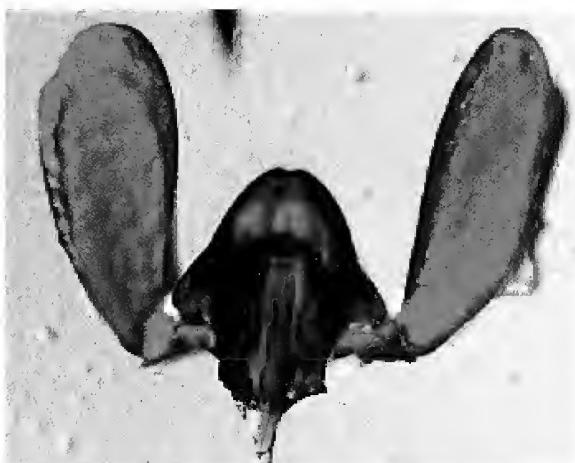


Retinacula with hips broader than the shoulders. **HB**

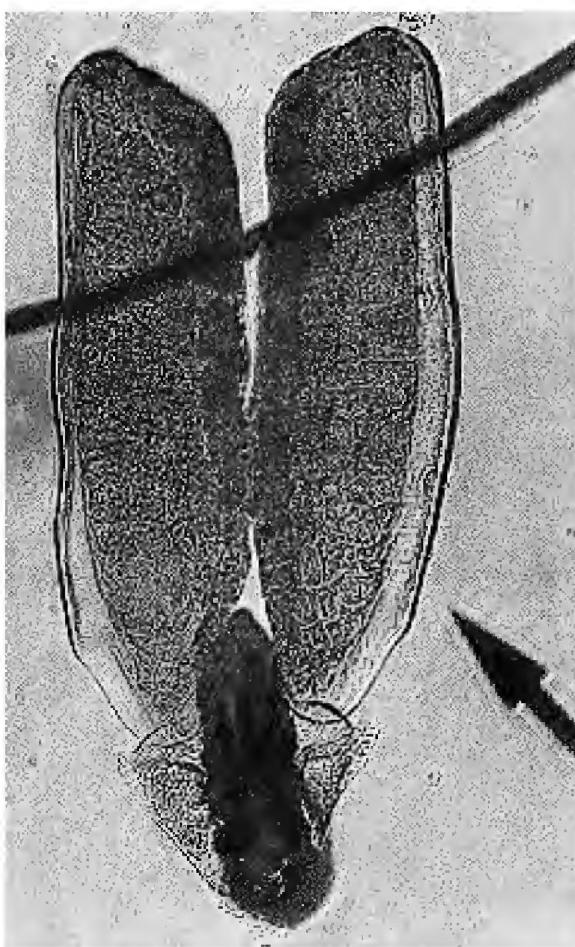
Translator type (**ls**) the most common type they are short linear, not extending beyond the lower pollinia ends.



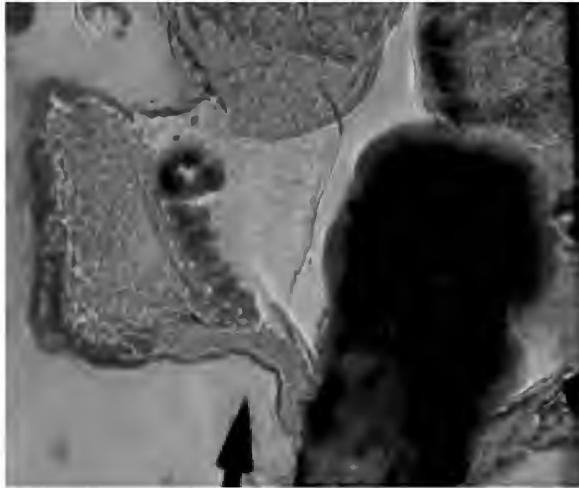
Translators (**fb**) fiddle shaped beyond the lower pollinia ends.



Translators perpendicular from the
Retinaculum (**p**)



Translators delta shaped (**d**) top supporting
the caudicle flat.



Translators with outer end squared off (**t**) truncate.



Translators with wide expansive base. (**fe**)

Here fe/o

Presentation Follows of Translator. caudicle types:

- | | | |
|-------------------|-----------------|-------------|
| 1. 2018 -1 a.b.c. | ls/o | 278 entries |
| 2. 2018-2 a,b. | fb.cw fb/o l/cw | 148 entries |
| 3. 2018 -3 | p/o | 63 entries |
| 4. 2018 -4 a.b | d/o | 149 entries |
| 5. 2018 -5 | t/o | 11 entries |
| 6. 2018 – 6 | ls/cw lb/cw | 11 entries |
| 7. 2018 – 7 | ls/r | 34 entries |
| 8. 2018 – 8 | cupped | 1 entry |
| 9. 2018 – 9 | fe/o | 1 entry |

Appendix

Species Arranged by Pollinia Length

Column:

1. name (if red there is no Holotype available). *
2. pollinia length
3. pollinia width
4. retinaculum length
5. retinaculum width
6. ratio retinaculum length / pollinia length
7. translator/caudicle type
8. pollinia inner end type
9. caudicle surface clear C or granular G
10. retinacula type

* These sp. and subsp. have been written up and ready for publication but I have been unable to get the type sheets made in the Philippines. Seems like no one wants to put in the effort or time to do this. Most of the material was collected by George Mendoza, who put a lot of time and expense in this effort. It is a shame and a great loss to the Philippines that so many plants are not named, published and recorded.

Species	#2	#3	#4	#5	#6	#7	#8	#9	#10
archboldiana	1.72	0.64	0.26	0.30	0	1	R	G	S
macgillivrayi	1.35	0.43	0.60	0.40	2.3	ls/o	R	C	HE
multiflora	1.27	0.28	0.20	0.18	6.2	ls/o	R		R
albiflora	1.22	0.45	0.61	0.50	2.0	ls/o	R	G	S
onychoides	1.14	0.40	0.35	0.30	3.3	ls/o	R	C	R
imbricata ssp. megapollinia	1.09	0.16	0.36	0.10	3.1	fb/cw	R		E
elliptica	1.07	0.34				l/cw	R	G	E
coriacea	1.08	0.30	0.59		1.8	l/cw	R	G	E
lobii	1.06	0.40	0.50	0.47	2.1	ls/o	T	G	S
amrita	1.05	0.28	0.35	0.22	3.0	ls/o	R	C	HE
imperialis	1.02	0.30	0.29	0.32	2.0	ls/o	R	C	S
coriacea ssp. <i>philippinensis</i>	1.00	0.26	0.40	0.10	2.5	ls/o	R	G	E
pubic. ssp. glabrapedicila	1.00	0.25	0.35	0.20	2.9	ls/o	T	?	HE
pruinosa/curt.	0.97	0.28	0.09	0.09	10.8	p/cw	R	C	HE
apoensis ssp sagittaria	0.95	0.23	0.40	0.15	2.4	fb/cw	R	G	E
odorata JP Batangas TG	0.95	0.35	0.40	0.30	2.4	ls/o	R	C	S
chunii	0.95	0.40	0.35	0.18	2.7	ls/o	T	G	S
obtusifolia CT Thailand	0.95	0.30	0.30	0.16	3.2	p/o	R	G	HE
stoneana	0.95	0.30	0.40	0.19	2.4	ls/o	RT	G	HE
imb. basisub Max, Wyatt	0.93	0.25	0.22	0.18	4.2	fb/cw	RT		E
darwinii	0.92	0.42	0.57	0.50	1.6	ls/o ?	R		R

	0.92	0.37	0.45	0.38	2.0	ls/o	R	G	S
lazaroi	0.92	0.26	0.40	0.14	2.3	ls/o	RT	G	R
skinneriana	0.92	0.32	0.44	0.17	2.0	p/o	R	G	E
odorata UC 18041	0.92	0.32	0.45	0.49	2.0	p/o	R		R
mitrata	0.90	0.32	0.45	0.49	2.0	p/o	R		R
cf. coriacea Toba TG	0.90	0.34	0.31	0.15	2.9	l/cw	RT	G	E
sp. salweenica	0.90	0.26	0.48	0.19	1.9	ls/o	R	C	R
halcanensis NS05-213	0.89	0.26	0.34	0.14	2.6	l/cq	RT	C	HE
melifluia	0.89	0.27	0.34	0.22	2.6	ls/o	T		S
halconensis NS05-225	0.88	0.25	0.30	0.14	2.9	l/cw	T	G	R
celata	0.87	0.25	0.33	0.20	2.6	ls/o	RT		R
darwinii ssp.	0.87	0.40	0.62	0.54	1.4	l/cw	R	G	R
mabilogensis									
mindorensis ssp. ehirsuta	0.87	0.28	0.23	0.27	3.8	ls/r	R	G	HH/LS
melifluia subsp. fraterna	0.87	0.27	0.37	0.19	2.4	ls/o	T		S
odorata TG	0.87	0.32	0.45	0.27	1.9	ls/o	R	C	R
megalaster	0.87	0.32	0.35	0.30	2.5	ls/o	R	C	S
loyceandrewsiae	0.85	0.27	0.32	0.20	2.7	ls/o	RT		R
irisae	0.85	0.35	0.91	0.09	0.9	ls/o	R	C	HE
buotii	0.85	0.30	0.27	0.15	3.1	l/cw	R		R
melifluia ssp. neuvaensis	0.84	0.24	0.23	0.22	1.7	p/o	T		S
pubicorolla ssp.	0.83	0.20	0.20	0.20	4.2	d/o	R	G	S
anthracina									
desvoeuxensis	0.83	0.14	0.16	0.09	5.2	ls/o	T	G	?
PNH 9385	0.82	0.27	0.24	0.14	3.4	ls/o	R		
pubicorolla	0.81	0.23	0.27	0.22	3.0	ls/o	T	C	S
australis subsp. aust.	0.81	0.35	0.44	0.22	1.8	ls/o	R	C	HE
NS 05 231	0.81	0.24	0.38	0.30	2.1	l/cw	R	C	HE
sp. MT 13	0.81	0.24	0.30	0.12	2.5	l/cw	RT	G	E
melifluia ssp.	0.80	0.25	0.21	0.26	3.8	p/o	R	G	S
darastanensis									
melifluia ssp. mendozae	0.80	0.25	0.25	0.18	3.2	ls/o	RT	G	R
motoskei	0.80	0.25	0.27	0.18	3.0	ls/o	T		S
sp. CI #3	0.80	0.23	0.16	0.12	6.7	ls/o	R		S
davaoensis	0.80	0.25	0.20	0.15	4.0	d/o	R	G	S
thompsonii CT Thailand	0.80	0.25	0.29	0.18	2.8	ls/o	F	C	HE
UC 49238	0.80	0.32	0.38	0.20	2.1	ls/o	RT		R?
excavata	0.79	0.27	0.27	0.18	2.3	ls/o	R	G	S
fraterna	0.79	0.23	0.35	0.14	5.2	l/cw	R	G	HE
sabaensis	0.78	0.25	0.14	0.13	5.6	p/o	R	G	S
279 ex India	0.77	0.24	0.27	0.15	2.9	ls/o	T		S
BSI #1	0.77	0.20	0.33	0.19	2.3	ls/o	R	C	R
PNH 13306	0.77	0.25					R	C	
linavergarae	0.77	0.32	0.25	0.12	3.1	l/cw	R	G	HE
bella	0.77	0.22	0.28	0.08	2.8	fb/cw	T	G	E
weebella	0.77	0.25	0.19	0.09	4.1	fb/cw	R	G	E
melifluia ssp. escobinae	0.77	0.39	0.32	0.37	2.4	ls/o	R		S

sp. MT 13	0.76	0.27	0.30	0.12	2.5	l/cw	RT	G	E
sp. Thailand C.T.	0.76	0.23	0.20	0.15	3.8	ls/o	RT	C	S
as apiculata not	0.75	0.32	0.23	0.19	3.3	ls/o	R	C	S
carnosa white	0.75	0.22	0.28	0.16	2.7	ls/o	RT	C	S
fuscomarginata	0.75	0.17	0.17	0.10	4.4	d/o	RT	G	HE
odorata ssp. antoinseneis	0.75	0.18	0.25		3.0		T		
paziae	0.75	0.25	0.30	0.22	3.0	ls/o	R	C	R
pachyclada	0.75	0.28	0.35	0.15	2.1	d/o	R	G	HE
carnosa D 124	0.75	0.22	0.28	0.16	2.7	ls/o	RT	C	S
as finlaysonii	0.75	0.26	0.27	0.18	2.8	d/o	T	G	HE
densifolia as cumingiana	0.75	0.30	0.15	0.10	5.0	ls/o	RT		R
corollamarginata	0.75	0.22	0.30	0.19	2.5	ls/o	T		S
georgemendozai	0.75	0.32	0.52	0.40	1.4	p/o	R		R
pseudorigida	0.75	0.25	0.25	0.19	3.0	d/o	RF	C	HE
aust. rupicola	0.74	0.28	0.33	0.21	2.2	ls/o	T	C	HE
petuana ssp. sigeleensis	0.74	0.23	0.37	0.23	2.0	ls/o	R		HU
subquintuplinervis	0.74	0.22	0.20	0.17	3.7	ls/o	R	G	S
fungii	0.74	0.19	0.25	0.16	3.0	ls/o	R	C	R
greenii	0.74	0.25	0.25	0.15	3.0	ls/o	R	C	S
acicularis	0.74	0.19	0.15	0.05	4.9	fb/cw	RT	C	E
australis subsp. oramicola	0.73	0.27	0.27	0.18	2.7	ls/o	T	G	HE
odorata UC 29638 Polillo	0.73	0.25	0.38	0.15	1.9	p/o	R	G	S
hervaezii	0.73	0.24	0.29	0.16	2.5	ls/o	T	C	S
patameaensis	0.73	0.24	0.27	0.18	2.7	p/o	T	G	S
purpureofusca	0.73	0.25	0.30	0.17	2.4	p/o	RT	C	S
Avila Ridge betchei	0.72	0.24	0.26	0.12	2.8	ls/o	RT	C	S ?
cinnamomifolia	0.72	0.27	0.30	0.20	2.4	d/o	RT	G	HE
aust. ssp. nathalieae	0.72	0.28	0.40	0.23	1.8	ls/o	RT	C	HE
darwinii ssp. minora	0.72	0.43	0.77	0.65	0.9	l/cw	R	G	R
odorata UC 14549	0.72	0.30	0.33	0.25	2.2	ls/o	RT	C	R
pubicenta	0.72	0.20	0.22	0.20	3.3	ls/o	T	G	S
publicorolla	0.72	0.23	0.27	0.22	2.7	ls/o	T	C	S ?
tamdaoensis	0.72	0.26	0.28	0.16	2.6	p/o	R	C	S
vitiensis TG	0.72	0.27	0.25	0.17	2.9	ls/o	R	G	HU
sp. India #3	0.72	0.20	0.20	0.15	3.9	ls/o	RT	G	R
serpens	0.72	0.27	0.22	0.15	3.3	ls/o	RT		S
leucorrhoda	0.71	0.25	0.30	0.17	2.4	p/o	R	G	R
paulshirleyi	0.71	0.20	0.18	0.12	3.9	d/o	RT	C	HE
odorata ssp. garciai	0.71	0.25	0.20	0.07	3.6	ls/o	R	G	LS
sp. palmate Fresno 2006	0.71	0.20	0.16	0.12	4.4	ls/o	R		HE
chlorantha var. tutuilensis	0.71	0.30	0.27	0.10	2.6	ls/o	T	G	E
nicholsoniae IML 39	0.70	0.30	0.23	0.17	3.0	ls/o	T	C	S
sp. UPLB 50 TN	0.70	0.26	0.29	0.11	2.4	l/cw	R	G	HE
taytayensis	0.70	0.23	0.21	0.15	3.3		R		R
sp. CI #3	0.70	0.14	0.14	0.06	5.0	ls/o	R	C	S
naumanii	0.70	0.29	0.30	0.22	2.3	ls/o	RT		S

sp. Balasik TG 94112	0.70	0.24	0.20	0.18	3.5	ls/o	R	G	S
santiagoi ssp. mandoza i	0.70	0.22	0.37		1.9	ls/o	R		
betchei W 3245	0.70	0.29	0.26	0.18	2.7	ls/o	T	G	S
sp. Bangkok 4	0.69	0.21	0.20	0.12	3.5	ls/o	T	C	S
dolichosparte	0.69	0.27	0.24	0.11	2.9	ls/o	R	C	S
gildingii	0.69	0.22	0.34	0.12	2.0	ls/o	T	G	S
cumingiana Fresno	0.69	0.27	0.25	0.15	2.8	ls/o	T		R
PNH 806	0.68	0.30	0.45	0.25	1.5	ls/o	R	G	S
imbricata green leaf	0.68	0.23	0.25	0.16	2.7	l/cw	T		LS
mindorensis ssp. superba	0.68	0.30	0.40	0.44	1.7	l/r	R	G	LN
mindor. ssp. sarawakensis	0.68	0.30-	0.45	0.25	1.5	l/r	R		LN
acuta Haworth 1821	0.68	0.24	0.29	0.11	2.3	ls/o	T		HE
vitiensis	0.68	0.27	0.27	0.16	2.5	ls/o	RT		HE
UC 13860 odorata	0.68	0.20	0.34	0.18	2.0	ls/o	T		HE
dischorensis not ischnopus	0.68	0.26	0.17	0.10	4.0	ls/o	R	C	S
acuta CT	0.67	0.23	0.22	0.16	3.0	ls/o	R	C	HE
UC 20732 cf. vitiensis	0.67	0.28	0.25	0.13	2.7	ls/o	R		S
golamcoiana	0.67	0.26	0.20	0.15	3.4	ls/o	T	G	R
chlorantha W 10477	0.67	0.23	0.17	0.20	3.9	ls/o	T		S
imbricata ssp. lagunaensis	0.67	0.20	0.25	0.10	2.7	d/cw	R	G	E
kloppenburgii	0.66	0.23	0.25		2.6	fb/cw	R	G	E
chlorantha	0.66	0.28	0.20	0.19	3.3	ls/o	T		S
chlorantha W 3111	0.66	0.28	0.20	0.19	2.4	ls/o	T		S
minibella	0.66	0.24	0.32	0.18	2.1	d/o	RT	G	S
W 6582 not vitiensis	0.65	0.25	0.24	0.18	2.7	d/o		G	T
savaiiensis ssp. falealupoensis W 8231	0.65	0.22	0.25	0.18	2.6	ls/o	S		S
fetuana ssp. tutuilensis	0.65	0.23	0.21	0.18	3.1	ls/o	RT	G	HU
acuta green flower	0.65	0.21	0.25	0.15	2.6	d/o	T	G	E
acuta new TG	0.65	0.23	0.22	0.11	3.0	p/o	T	G	E
fetuana	0.65	0.23	0.25	0.18	2.6	ls/o	R	G	S
seanwhistleriana	0.65	0.24	0.23	0.19	2.8	ls/o	R	C	S
rigida	0.65	0.24	0.22	0.12	3.0		T		S
sp. Sulawesi med. flower	0.65	0.27	0.23	0.16	2.8	ls/o	R		S
odorata ssp. taytayensis	0.65	0.24	0.34		1.9		R		
rigida CT Thailand	0.65	0.24	0.22	0.12	3.0	p/o	T	G	S
sp. shephardell	0.65	0.21	0.24	0.15	2.7	d/o	RT		S
80-03	0.65	0.21	0.14	0.14	4.6	d/o	R	G	R
sp. PNH 1268	0.65	0.21							
sp. fetuana W 8717	0.65	0.21	0.22	0.15	3.0	ls/o	R	G	HU
campanulata	0.64	0.21	0.30	0.10	2.1	fb/cw	RT	G	HE
shephardii Short ex Hooker	0.64	0.23	0.24	0.10	3.8	ls/o	RT		S?
cumingiana ssp. rezalensis	0.64	0.20	0.17	0.15	3.8	ls/o	T		R

	0.64	0.23	0.17	0.13	3.8	ls/o	R	C	S
sp. Matafoao Rg. Am.									
Samoa									
cf. amoeana	0.64	0.23	0.15	0.14	4.2	b/o	R	C	S
USDA 354238	0.64	0.26	0.19	0.14	2.5	d/o	R	G	S
finlaysonii	0.64	0.21	0.21	0.12	3.0	ls/o	R	G	S
sp. laurifolia	0.64	0.19	0.17	0.10	3.8	ls/o	R		S
cumingiana ssp. biloba	0.63	0.17	0.18	0.12	3.5	ls/o	T	C	R
whistlerii	0.63	0.20	0.21	0.14	3.0	ls/o	R	G	S
NS05-162	0.63	0.22	0.21	0.14	3.0	d/o	RT	G	HE
recurvula sub. bokorensis	0.63	0.27	0.15	0.14	4.2	ls/o	R	C	S
meridithii x crassicaulis	0.63	0.23	0.23	0.13	2.7	ls/o	R		S
CAHUP 61933	0.63	0.29	0.55	0.25	1.1	ls/o	R		LN
sp. Sabah, Malaysia	0.63	0.23	0.21	0.15	3.0	ls/o	R		S
caudata	0.62	0.16	0.17	0.07	3.6	fb/cw	T	C	E
odorata UC 13176	0.62	0.21	0.29		2.2	ls/o	R		
PNG #4	0.62	0.22	0.18	0.09	3.4	ls/o	RT	C	S
limonica	0.62	0.19	0.22	0.10	2.8	p/o	T	C	S
Diversifolia subsp. Yap	0.62	0.22	0.22	0.12	2.8	ls/o	T	G	S
obovata	0.62	0.19	0.22	0.16	2.8	ls/o	T	G	HU
diversifolia ssp. chlorina	0.61	0.25	0.17	0.18	3.6	ls/o	T	C	S
subquintuplinervis	0.61	0.22	0.14	0.14	4.4	ls/o	RT		R?
mindorensis ssp.	0.60	0.30	0.35	0.30	1.7	ls/r	R	G	LN
recurvula									
mindorensis ssp.	0.60	0.25	0.35	0.30	1.7	ls/r	R	G	LH
horizontala									
ubudensis	0.60	0.21	0.16	0.11	3.8	d/o	R		R?
monetteae	0.60	0.20	0.14	0.14	4.3	ls/o	T		HU
samoensis ssp savai'iensis	0.60	0.18	0.10	0.07	6.0	ls/o	R	C	HU
samoensis W1506 Upolu	0.60	0.20	0.15	0.14	4.0	ls/o	RT	G	S
mindorensis ssp. cremea	0.60	0.25	0.34	0.25	1.8	ls/o	R	C	LH
medinai	0.60	0.25				ls/o	T		S
cuminging. ssp.	0.60	0.18	0.15	0.15	4.0	ls/o	F		R
flosvirida									
wibergiae	0.60	0.21	0.23	0.15	2.6	d/o	T	G	R
wibergiae ssp. alba Klopp.	0.60	0.25	0.25	0.10	2.4	p/o	RT		2S
corolla. ssp. magiagiensis	0.60	0.25	0.29	0.20	2.1	d/o	T	G	HU
andalensis	0.59	0.19	0.12	0.12	4.9		R		HU
kerrii Thai. white	0.59	0.24	0.24	0.17	2.5	ls/o	R		S
mindor. ssp.	0.59	0.30	0.35	0.25	1.7	ls/r	R	C	LH/HH
kanagongensis									
recurvula Malaysia	0.59	0.25	0.25	0.12	2.4	d/o	RT	G	R
kerrii Marin Cactus Patch	0.58	0.24	0.20	0.16	2.9	ls/o	T		HU
sp. IPPS 7020	0.58	0.20	0.25	0.12	2.3	ls/o			HU
vitellinioides?									
ABG #12 NG	0.58	0.22	0.22	0.12	2.6	d/o	RT	G	R
mindor. ssp. altransa	0.57	0.27	0.39	0.25	1.5	ls/r	R	G	LH

mindor. ssp. waymaniana	0.57	0.27	0.34	0.29	1.7	ls/r	R	G	LN
bandongii	0.57	0.22	0.31	0.24	1.8	ls/o	R		HE
mindor. ssp. duoa	0.57	0.20	0.20	0.21	2.9	ls/r	R	G	LH
benitotanii	0.57	0.14	0.07	0.06	8.1	fb/cw	T	G	S
sp. Ben Vergara #56	0.57	0.23	0.12	0.10	4.8	ls/o	R		S
juannguoana	0.57	0.16	0.22	0.07	2.6	d/o	T	C	E
estrellaensis	0.57	0.21	0.22	0.11	2.6	p/o	RT	G	E
sp. DAV 819 as cominsii	0.57	0.21	0.23	0.13	2.5	d/o	T	C	S
sp. Mt. Mantavani, Samoa	0.57	0.21	0.20	0.12	2.9	ls/o ?	R		HE
sp. Sulawesi med fl.	0.57	0.23	0.20	0.13	2.9	ls/o	R	G	S ?
erythrina	0.57	0.18	0.30	0.08	1.9	d/o	RT	G	E
erythrostemma	0.57	0.23	0.30	0.22	1.9	l/r	R	C	LH
tannaensis	0.57	0.25	0.17	0.17	3.4	ls/o	T	C	R
gretherii	0.57	0.25	0.20	0.12	2.9	ls/o	R	G	S
mindo. ssp. querinoensis	0.57	0.26	0.35	0.28	1.7	ls/r	R	G	LN
quisumbingii	0.57	0.18	0.27	0.11	2.1	ls/o	RT	C	E
mindor. ssp. globosa	0.56	0.30	0.31	0.30	1.8	ls/r	R	G	LN
ofuensis	0.56	0.26	0.27	0.16	2.1	ls/o	R	C	S
loheri UC	0.56	0.24	0.21	0.17	2.7	fb/cw	T	C	S
mindor. ssp. tingkoyensis	0.56	0.27	0.45	0.30	1.2	ls/r	R	C	LH
nagtabonensis	0.56	0.19	0.22	0.08	2.5	d/o	RT	G	LS
diversifolia Malaya	0.56	0.23	0.23	0.14	2.4	ls/o	R	G	S
vitellina	0.56	0.18	0.24	0.10	2.3	d/o	T	G	HE
citrina	0.56	0.18	0.23	0.12	2.4	d/o	S	C	HE
neoebudica	0.56	0.17	0.16	0.12	3.5	d/o	F	G	HE
sp. Samoa Dbl.	0.55	0.19	0.23	0.10	2.4	ls/o	F	C	S ?
sp. whistlerii W 8798	0.56	0.26	0.27	0.16	2.1	ls/o	R	G	S
lucyae	0.55	0.20	0.19	0.08	2.9	fb/cw	T	G	S
matavanuensis	0.55	0.26	0.26	0.15	2.1	ls/o	T	G	S
tiatuitaensis	0.55	0.20	0.20	0.13	2.8	ls/o	T	C	HE
smithii	0.55	0.20	0.20	0.19	2.8	ls/o	RT	G	R
whistlerii ssp. faleuluensis	0.55	0.21	0.15	0.12	3.7	ls/o	R	C	HU
mindor. ssp. luzonensis	0.55	0.30	0.32	0.22	1.7	ls/r	R	C	LH
sp. W9539 matavanuensis	0.55	0.26	0.26	0.15	2.1	d/o	F	G	S
sp. 557	0.55	0.20	0.16	0.08	3.4	lb/cw	T	C	S
sp. Matoata cream	0.55	0.22	0.15	0.12	3.7	ds/o	R	G	S
deykei	0.55	0.16	0.32	0.09	1.7	d/o	RT	C	E
plicata	0.55	0.19	0.20	0.07	2.8	t/cw	T	G	E
Tioman Is. Malaysia TG	0.55	0.18	0.17	0.08	3.2	t/cw	RT	G	E
sp. Bostrom	0.55	0.19	0.15	0.10	3.7	p/o	R	C	S
longifolia	0.55	0.26	0.23	0.14	2.4	ls/o	R	G	S
mindor. ssp. squama	0.55	0.24	0.24	0.20	2.3	ls/r	R	G	LN
golamcoiana CAHUP	0.55	0.20	0.15	013	3.7	ls/o	R	G	LS
41930									

	0.55	0.19	0.13	0.14	4.2	d/o	R	C	S
querinoensis	0.55	0.23	0.22	0.14	2.5	ls/o	R	C	S
sp. CAHUP18680	0.55	0.24	0.23	0.17	2.4	ls/o	R	G	S
sp. UC 49328 Mati, Davao	0.55	0.26	0.28	0.15	2.0	ls/o	R	G	S
ramosii	0.55	0.22	0.22	0.15	2.5	d/o	T	G	S
shephardii	0.54	0.29	0.22	0.29	2.5	l/r	R	G	LH
mindorensis ssp. gelba	0.54	0.18	0.23	0.08	2.3	p/o	RT	G	E
benguetensis UC 14997	0.54	0.19	0.13	0.12	4.2	ls/o	T	C	HU
cominsii IML 457	0.54	0.17	0.15	0.08	3.6				E
sp. Perpich 428 WHERE	0.54	0.19	0.13	0.12	4.2	ls/o	T	C	
bicolor	0.54	0.15	0.25	0.07	2.2	p/o	RT	G	S
purificacioniae plant lost	0.54	0.23	0.17	0.14	3.2	d/o	RT	C	S
sp. USDA 354241	0.54	0.20	0.21	0.11	2.6	d/o	R	G	HE
sp. IML 557 gracilis	0.54	0.20	0.22	0.10	2.6	fb/cw	T	C	S
kerrii hairy	0.54	0.23	0.22	0.10	2.5	ls/o	R		S
corolla. ssp. upoluensis	0.54	0.20	0.15	0.11	3.6	ls/o	F	C	S
mindor. ssp.	0.54	0.22	0.30	0.21	1.8	ls/r	R	G	LN
nagcarlanensis									
savaiiensis	0.54	0.21	0.18	0.12	3.0	ls/o	T	G	S
surigaoensis	0.53	0.14	0.11	0.06	4.8	d/o	T	G	S
mindor. ssp. lalawanensis	0.53	0.29	0.26	0.20	2.0	ls/r	R	C	HH
edwinofernandoi	0.53	0.25	0.12	0.12	4.4	fb/cw	R	C	S
sp. W 9456	0.53	0.22	0.17	0.14	3.1	ls/r	T	G	S
sp. PNH 7889	0.53	0.20	0.27	0.10	1.5		F		S
crassicaulis 89053 DH	0.53	0.22	0.25	0.08	2.1	p/o	R	G	S
diversifolia 1981 Bogor	0.53	0.18	0.25	0.18	2.8	d/o	RT	G	S
crassicaulis	0.53	0.15					T		S
hainanensis 9757	0.53	0.21	0.26	0.14	2.0	ls/o	R	C	HE
pauciflora	0.53	0.26	0.21	0.26	2.5	ls/o	R	C	S
sp. Nagtabon yellow	0.53	0.16	0.23	0.08	2.3	p/o	T	G	E
anncajanoae	0.52	0.20	0.12	0.09	4.3	fb/cw	T	C	S
diversifolia el-nidicus	0.52	0.20	0.18	0.12	2.9	ls/o	T		S
finlaysonii Yap	0.52	0.20	0.15	0.11	3.5	p/o	RT	G	S
sp. Yap Singapore 2003	0.52	0.24	0.31	0.20	1.7	l/r	T	G	LH
sp. marginata	0.52	0.2074	0.17	0.12	3.1	ls/o	RT	C	S
telosmoides	0.52	0.22	0.23	0.14	2.3	ls/o	R		S
mindor. ssp. lagunaensis	0.52	0.26	0.25	0.24	2.1	ls/r	RT	G	LN ?
uncinata	0.52	0.27	0.29	0.28	1.8	ls/o	R	C	S
amoena ssp. bogorensis	0.52	0.21	0.14	0.20	3.7	p/o	R	C	S
cardiophylla 910302	0.52	0.18	0.20	0.07	2.6	d/o	RT	C	LS
foetida	0.52	0.18	0.18	0.08	2.9	fb/cw	T	C	E
vitellinoides	0.52	0.19	0.22	0.04	2.4	ls/o	F		E
mindorensis Schltr.	0.52	0.17	0.34	0.20	1.5	ls/r	R	G	LN
mindor. ssp. viscayaensis	0.52	0.17	0.35	0.25	1.5	ls/r	R	G	LN
quinquinervia (UC) 1013	0.52	0.22	0.34	0.09	1.5	ls/o	R	G	E
benvergarai #54	0.52	0.21	0.13	0.16	4.0	d/o	R	C	S
mindorensis 890508	0.52	0.24	0.30	0.22	1.7	ls/r	R	G	LN

graveolens	0.52	0.19	0.21	0.06	2.5	d/o	R	C	E	
fitoensis	0.52	0.22	0.15	0.10	3.5	ls/o	T			HU
sp. W 1106 as filiformis	0.52	0.21	0.18	0.09	2.9	ls/o	R			S
<i>verticillata</i> ssp. <i>greenii</i>	0.52	0.21	0.14	0.20	3.7	p/o	R			HR
lamingtoniana	0.52	0.22	0.18	0.12	2.9	ls/o	T	C	S	
<i>isabelaensis</i>	0.51	0.20	0.12	0.12	4.3	d/o	R	G	S	
<i>soligamiana</i>	0.51	0.18	0.11	0.09	4.6	d/o	T	C	S	
sp. UC 295	0.51	0.20	0.21	0.11	2.4	ls/o	T			S ?
sp. 577	0.51	0.20	0.16	0.08	3.2	lb.cw	T	C	S	
lanceolata	0.51	0.22	0.27	0.09	1.9	l/cw	R	G	HE	
<i>mindorensis</i> ssp. <i>rosea</i>	0.51	0.24	0.29	0.21	1.8	ls/r	R	G	LH	
<i>hamiltoniana</i>	0.51	0.22	0.42	0.36	1.2	ls/o	R	G	HE	
<i>gigantangensis</i> PNH 36787	0.51	0.15	0.19		2.9	ls/o	T			S
<i>uafatoensis</i>	0.51	0.20	0.12	0.11	4.3	ls/o	T			HU
lambii BISH 9905	0.51	0.21	0.17	0.22	3.0	d/o	T	C	S	
Cebu JP	0.51	0.18	0.22	0.11	2.3	d/o	T	G	S	
pentaphlebia	0.51	0.18	0.23	0.09	2.2	d/o	T	G	HE	
cagayanensis Monina	0.51	0.24	0.25	0.09	2.2	d/o	T			LN
<i>isabelaensis</i>	0.51	0.20	0.12	0.12	4.3	ls/o	RT			S
<i>odorata</i> CAHUP 19258	0.51	0.21	0.19	0.12	2.9	ls/o	T			S
<i>butleriana</i> (Purificacion #3)	0.51	0.22	0.29	0.14	1.8	d/o	T	G	2S	
<i>mindor.</i> ssp. <i>tacta</i>	0.51	0.25	0.30	0.20	1.7	ls/r	R	G	LH	
<i>mindor.</i> ssp. <i>mendozae</i>	0.50	0.25	0.38	0.19	1.3	ls/r	R	G	LH	
<i>mindor.</i> ssp. <i>condupla</i>	0.50	0.23	0.29	0.17	1.7	ls/r	R	G	LH	
<i>mindor.</i> ssp. <i>hirsuta</i>	0.50	0.24	0.30	0.25	1.7	ls/o	R	G	LH	
<i>aurigue.</i> ssp. <i>alticolora</i>	0.50	0.20	0.06	0.12	8.3	d/o	R	G	S	
<i>landgrantensis</i>	0.50	0.13	0.12	0.11	4.2	ls/o	RT	C	S	
<i>coronaplanata</i>	0.50	0.19	0.15	0.15	3.3	ls/o	R	G?	S	
<i>cumi.</i> ssp. <i>kamagongensis</i>	0.50	0.17	0.15	0.08	4.5	ls/o	T	G	H	
<i>cumi.</i> ssp. <i>catanduanensis</i>	0.50	0.15	0.20	0.13	2.5	ls/o	T			LH
<i>marisanii</i>	0.50	0.19	0.11	0.14	4.5	d/o	R	G	S	
<i>mindor.</i> ssp. <i>bakerensis</i>	0.50	0.25	0.29	0.18	1.7	ls/r	R	C	LN	
<i>mindor.</i> ssp. <i>ligulasepala</i>	0.50	0.23	0.29	0.29	1.7	ls/r	R	G	HH	
<i>mindor.</i> ssp. <i>lagyoensis</i>	0.50	0.23	0.30	0.25	1.7	ls/r	R	G	HH	
samoensis W 1297	0.50	0.20	0.15	0.11	3.3	ls/o	R			S
<i>landgrant.</i> ssp. <i>siniloanensis</i>	0.50	0.22	0.15	0.13	3.3	ls/o	RT	C	S	
blasher. ssp. <i>bigaensis</i>	0.50	0.25	0.11	0.14	4.5	ls/o	RT			S
blas yellow variant	0.50	0.21	0.07	0.10	3.8	d/o	RT	C	S	
<i>coronaplanata</i> ssp. <i>bakyaanensis</i>	0.50	0.20	0.08	0.11	6.3	ls/o	R	C	S	
mucronulata	0.50	0.20	0.30	0.20	1.7	ls/o	S			S
<i>ranauensis</i>	0.50	0.19	0.15	0.12	3.3	ls/o	T			LS
<i>siniloanensis</i>	0.50	0.18	0.15	0.11	3.3	p/o	RT	C	S	

sp. Mt. Galego	0.50	0.18	0.20	0.14	2.5	ls/o	T	S
elsae	0.50	0.17	0.15	0.15	3.3	d/o	R	S
calyxminuta	0.50	0.16	0.20	0.08	2.5	p/o	T	E-HB
sp. Maximo Wayet Diffin	0.50	0.16	0.19	0.09	2.6	ls/o	T	E
marionii	0.50	0.11	0.15	0.06	3.3	d/o	R	G
tauensis	0.50	0.20	0.15	0.11	3.3	ls/o	R	S
querinoensis	0.50	0.15	0.15	0.08	3.3	p/o	T	G
litii	0.50	0.14	0.12	0.12	4.2	p/o	T	G
perangensis	0.49	0.20	0.11	0.14	4.5	d/o	RT	C
aff. rumphii	0.49	0.16	0.17	0.08	2.9	l/cw	T	G
lanato'oensis	0.49	0.18	0.17	0.14	2.9		T	
meridithii	0.49	0.17	0.24	0.08	2.0	d/o	T	G
crassicaulis ends up	0.49	0.18	0.21	0.09	2.3	d/o	T	E
mindor. ssp. mabilogensis	0.49	0.30	0.30	0.25	1.6	ls/r	R	G
crassi. 90143 Catanduanes	0.49	0.16	0.19	0.05	2.6	p/o	T	S ?
cystiantha	0.49	0.23	0.20	0.11	2.5	l/cw	R	G
wayetii	0.48	0.15	0.16	0.04	3.2	fbew	T	C
linearis TN	0.48	0.19	0.16	0.09	3.0	l/cw	R	S
maxima Sulawesi	0.48	0.16	0.19	0.18	2.5	f/cw	T	E
cf. imbricata ssp.	0.48	0.16	0.19	0.08	2.5	lb/cw	T	E
sulawensis								
910301 DH BA	0.48	0.16	0.18	0.08	2.5	d/o	T	C
Vial #20 GM cf Fitchii	0.48	0.19	0.14	0.14	3.4	d/o	R	G
sp. PNH 14203 Palawan	0.48	0.20	0.18	0.13	2.7	p/o	RF	G
crassicaulis PT	0.48	0.19	0.23	0.09	2.1	d/o	RF	G
teodymendozae	0.48	0.19	0.18	0.08	2.7	ls/o	RT	G
blas. ssp. valmoriana	0.48	0.23	0.10	0.15	4.8	d/o	R	C
williamoliveriana	0.48	0.20	0.13	0.10	3.7	l/cw	T	C
waymaniae	0.48	0.12	0.09	0.07	5.3	Uniq	R	G
sp. CAHUP 3935	0.48	0.17	0.22	0.08	2.2	p/o	RT	G
sulitii PNH 10147	0.48	0.19	0.26	0.12	1.8	ls/o	R	LS
crassicaulis #14440	0.48	0.18	0.21	0.09	2.3	ls/o	R	S
crassicaulis	0.48	0.19	0.23	0.09	2.1			S
crassicaulis 5297	0.47	0.14	0.15	0.14	3.1			S
palawanensis ssp. majora	0.47	0.19	0.10	0.12	4.7	d/o	R	C
makatongensis	0.47	0.18	0.14	0.15	3.6	d/o	RT	C
marlowii ssp. infantaensis	0.47	0.16	0.20	0.08	2.4	d/o	RT	C
luatekensis	0.47	0.20	0.17	0.14	2.8	ls/o	R	G
bebsguevarrae	0.47	0.21	0.13	0.10	3.6	d/o	T	C
benvergarae ssp. gelba	0.47	0.20	0.19	0.12	3.1	d/o	T	S
linapauliana	0.47	0.20	0.15	0.14	3.1	d/o	R	G
linapauliana ssp. verida	0.47	0.20	0.13	0.14	3.6	d/o	T	C
linapauliana ssp.	0.47	0.20	0.15	0.15	3.1	d/o	R	S
nakarensis								
mindor. ssp. siniloanensis	0.47	0.19	0.23	0.18	2.0	ls/r	R	G
marlowii	0.47	0.14	0.18	0.09	2.6	p/o	R	G
								LN
								LS

	0.47	0.16	0.22	0.07	2.1	p/o	R	G	E
sp. 900307 JP merrillii	0.47	0.19	0.12	0.13	3.9	fb/cw	T	G	S
palawanensis	0.47	0.19	0.10	0.12	4.7	d/o	R	C	HU
pala. ssp. minora	0.47	0.20	0.12	0.11	3.9	d/o	RT	C	S
sp. filiformis	0.47	0.21	0.27	0.14	1.7		R		S
tamaleaae	0.47	0.21	0.15	0.11	3.1	ls/o ?	F		S
sp. PNH 5733	0.47	0.16	0.18	0.15	2.6	ls/o	T		
sp. Long Miau TG 1305	0.47	0.14	0.26	0.06	1.8	p/o	T	C	E
sp. 2012-4-029	0.47	0.18	0.17	0.12	2.8	d/o	R	C	S
marvinii	0.47	0.17	0.12	0.06	3.9	ls/o	R	G	E
900355	0.47	0.16	0.19	0.09	2.5	d/o	T	G?	HS
Poring Hot Springs, TG	0.47	0.15	0.18	0.09	2.6	ls/o	T		LS
sulawesi									
sp. whistlerii W 7605	0.47	0.20	0.17	0.14	2.8				S
bicknellii	0.46	0.15	0.12	0.05	3.8	lb/o	T	G	S
cajanoae	0.46	0.20	0.21	0.11	2.2	d/o	T	C	LS
aurigueana	0.46	0.20	0.11	0.10	4.2	d/o	T	G	S
mindor. ssp. granulata	0.46	0.23	0.25	0.20	1.8	ls/r	R	G	LH
lavacensis	0.46	0.18	0.14	0.12	3.3	p/o	R	G	S
josetteae	0.46	0.18	0.14	0.06	1.8	fb/cw	T	C	HB
uplandgrantensis	0.46	0.18	0.14	0.10	3.3	d/o	RT	G	S
cagayanensis UC 45730	0.46	0.26	0.39	0.27	1.2	d/o	T		LN
incrassata (catanduanes)	0.46	0.16	0.20	0.08	2.3	d/o	F	G	E
forbesii	0.46	0.19	0.22	0.07	2.1	d/o	R	C	E
persicina subsp. triplexa	0.46	0.19	0.13	0.16	3.5	ls/o	I	C	S
kanyakumariniana	0.46	0.16	0.11	0.06	4.2	fb/cw	F	C	S
auripigmenta	0.45	0.21	0.15	0.15	3.0	d/o	R	C	S
blasher. ssp. diluta AC #4	0.45	0.17	0.15	0.15	3.0	ls/o	F		S
benstoneana	0.45	0.18	0.15	0.12	3.0	d/o	RT	G	S
chiekoae	0.45	0.14	0.10	0.06	4.5	fb/cw	F	C	S
corollanerva	0.45	0.20	0.15	0.15	3.0	ls/o	R	G	R
ilagiorum	0.45	0.17	0.17	0.12	2.6	p/o	T	G	R
marizae	0.45	0.18	0.19	0.14	2.4	d/o	RT	G	S
persicina	0.45	0.19	0.10	0.12	4.5	ls/o	R	C	S
persicina ssp. rosea	0.45	0.18	0.15	0.12	3.0	d/o	R	G	S
crassic. ssp. mendozae	0.45	0.12	0.20	0.09	2.3	d/o	T	G	HE
mindor. ssp.	0.45	0.19	0.28	0.21	1.6	ls/r	R	G	LH
corollastriata									
myrme. ssp. kapatalanensis	0.45	0.16	0.13	0.12	3.5	ls/o	RT	C	RH
persicina ssp. lalawanensis	0.45	0.19	0.12	0.14	3.8	ls/o	T	C	S
foxii PNH 5032	0.45	0.21	0.41		1.1		RT		
persicina ssp. inawaensis	0.45	0.20	0.15	0.15	3.0	d/o	R	G	S
aurigipigm. ssp. papillata	0.45	0.20	0.13	0.15	3.5	d/o	F	C	S
crassicaulis 46116 UC	0.45	0.14	0.22	0.08	2.0	ls/o	T	C	E

cardiophylla 910301 DH	0.45	0.14	0.18	0.07	2.5	d/o	RT	C	LS
velasioii ssp. grandiora	0.45	0.13	0.20	0.08	2.3	d/o	R		LS
kentiana Perpich 428	0.45	0.15	0.14	0.05	3.0	lb/cw	T	G	R
obtusata	0.45	0.14	0.08	0.05	5.6	lb/cw	T	G	R
quadrata	0.45	0.14	0.08	0.05	5.6	fb/cw	T	G	R
marlowii	0.45	0.14	0.18	0.09	2.5	p/o	R	G	LS
marlowii ssp. polilloensis	0.45	0.15	0.20	0.11	2.3	p/o	RT	C	LS
bicolor ssp. polilloensis	0.45	0.15	0.29	0.09	1.6	d/o	RT	G	R
rosarioae	0.45	0.14	0.10	0.05	4.5	fb/cw	T		R
sp. NH #1	0.45	0.17	0.16	0.16	2.8	t/o	F	G	S
NS-0009	0.45	0.10	0.19	0.05	2.4	l/cw	T	G	
sp. NH # 1	0.45	0.17	0.12	0.12	3.8	t/cw	F	G	S ?
larrycahilogii	0.45	0.17	0.15	0.07	3.0	p/o	T	G	WH
tamayensis	0.45	0.20	0.13	0.14	3.5	ls/o	T	C	S
sp. IML 1056	0.44	0.19	0.13	0.05	3.5	ls/o	RT	G	LS
alwitriana	0.44	0.17	0.19	0.08	2.3	d/o	T	C	LS
aurantiaca	0.44	0.19	0.11	0.15	4.0	ls/o	T	C	S
aurantiaca ssp. armenia	0.44	0.19	0.15	0.16	2.9	l/o	T	C	S
lucbanensis ssp.	0.44	0.20	0.17	0.10	2.6	p/o	RT	C	HE
auroraensis									
aurantiaca ssp. lagyoensis	0.44	0.20	0.14	0.13	3.1	d/o	T	G	S
samoaalbiflora.	0.44	0.21	0.21		2.1	ls/o	R		
bakyaanensis	0.44	0.20	0.10	0.15	4.4	d/o	R	C	S
blaschneraezii	0.44	0.20	0.27	0.20	1.6	ls/o	F	C	LN
tamayensis	0.44	0.20	0.13	0.14	3.4	ls/o	T	C	S
penta	0.44	0.15	0.10	0.06	4.4	t/cw	T	G	S
solaniflora UC 18214	0.44	0.20	0.23	0.13	1.9	ls/o	R		S
kastbergii UC 203003	0.44	0.18	0.17	0.07	2.6	t/cw	T	C	E
olosegaensis	0.44	0.18	0.17	0.11	2.6	ls/o	R		LN
sp. EG 06097	0.44	0.16	0.13	0.10	3.4	d/o	RT	C	S
catanduanensis	0.44	0.17	0.17	0.14	2.6	ls/o	T		R
sp. latifolia	0.44	0.15	0.12	0.10	3.7	d/o	T	G	HU
micrantha	0.44	0.14	0.09	0.08	4.9	fb/cw	T	C	S ?
armeniaca	0.43	0.15	0.12	0.12	3.6	d/o	RT	G	S
rizaliana	0.43	0.17	0.08		5.3	fb/cw	F	C	R
burtoniae	0.43	0.15	0.14	0.07	3.1	fb/cw	T	G	LS
davidgoyderiae	0.43	0.20	0.12	0.10	3.6	ls/o	T	C	S
marizae	0.43	0.20	0.29	0.15	1.5	d/o	RT	C	S
fitchii	0.43	0.17	0.11	0.12	3.9	ls/o	R	G	S
lucbanensis	0.43	0.17	0.16	0.04	2.7	p/o	R	G	2S
lucardenasiana	0.43	0.14	0.23	0.13	1.9	d/o	R		HE
liljebjorniana	0.43	0.18	0.15	0.14	2.9	ls/o	R	C	S
polilloensis	0.43	0.16	0.19	0.07	2.7	d/o	RT	G	E
rhodostella	0.43	0.18	0.12	0.09	3.6	fb/cw	RT	G	S
ormacensis	0.43	0.13	0.23	0.09	1.9	p/o	F	G	LS
imbric. speck. mottled lf.	0.43	0.16	0.13	0.07	3.3	lb/o	R		R

<i>velasioii</i> Kloppenburg	0.43	0.14	0.15	0.08	2.9	p/o	RT	G	LS
<i>ralphdavisoniana</i>	0.43	0.18	0.15	0.15	2.9	ls/o	FW	C	S
<i>blashern.</i> ssp.	0.43	0.25	0.14	0.15	3.1	ls/o	R	C	S
<i>maragondonensis</i>									
<i>opposita</i>	0.43	0.16	0.15	0.10	2.9	ls/o	R	G	S
<i>espaldoniana</i>	0.42	0.18	0.10	0.09	4.2	fe/o	T	G	S
<i>anncajanoae</i> ssp.	0.42	0.19	0.15	0.09	2.8	fb/cw	RT	G	LS
<i>lagyoensis</i>									
<i>vicencioana</i> ssp.	0.42	0.15				ls/o	T	G	S
<i>querinoens.</i>									
NS05-206	0.42	0.14	0.11	0.11	3.8	d/o	R		S
<i>anneleesoligamae</i>	0.42	0.15	0.18	0.07	2.3	d/o	F	C	LS
<i>gelba</i>	0.42	0.18	0.17	0.10	2.5	d/o	R	G	HU
<i>blashern.</i> ssp.	0.42	0.20	0.10	0.15	2.8	ls/o	F	C	S
<i>ferrerasiana</i>									
<i>kanalaonensis</i>	0.42	0.20	0.15	0.10	2.8	fb/cw	T	G	S
<i>katherinechallisiana</i>	0.42	0.20	0.14	0.16	3.0	d/o	R	C	S
<i>myrmecopa</i>	0.42	0.16	0.17	0.10	2.5	fb/cw	F	C	HL
<i>persic.</i> ssp.	0.42	0.19	0.12	0.15	3.5	d/o	R	C	S
<i>tagumpayensis</i>									
<i>persic.</i> ssp.	0.42	0.19	0.16	0.12	2.6	d/o	RT	C	S
<i>tingkoyanensis</i>									
<i>pimenteliana</i>	0.42	0.20	0.24	0.20	1.8	ls/o	T	G	LN
sp. UC 49395 <i>fischeriana</i>	0.42	0.18	0.23	0.15	1.8	ls/o	R		HE
<i>quinquinervia</i> 81100	0.42	0.16	0.13	0.10	3.2	ls/o	F	G	S
<i>blasher.</i> ssp.	0.42	0.19	0.16	0.12	2.8	d/o	T	C	S
<i>tingkoyanensis</i>									
<i>vicencioana</i>	0.42	0.15	0.15	0.17	2.8	ls/o	R		HU
NS00-004	0.42	0.16	0.10	0.06	4.2	fb/cw	T	C	S
<i>blass.</i> ssp. <i>recurvula</i>	0.42	0.21	0.11	0.15	3.8	p/o	T	C	HU
<i>blass.</i> ssp. <i>straminea</i>	0.41	0.21	0.17	0.08	2.4	d/r	RT	G	S
<i>eburnea</i>	0.41	0.18	0.16	0.12	2.6	d/o	RT	G	S
<i>cremora</i>	0.41	0.19	0.12	0.10	3.1	d/o	R	C	HU
<i>faoensis</i> W 5714	0.41	0.20	0.11	0.14	3.7	d/o	T	G	S
CAHUP 5967 <i>incrassata</i>	0.41	0.15	0.17	0.08	2.4	d/o	RT		S
<i>obscura</i> PT 1979	0.41	0.14	0.13	0.06	3.2	fb/o	F	C	LS
sp. PNH 37800 <i>Irosin</i>	0.41	0.16	0.16	0.12	2.6	fb/o	R	C	S?
<i>bacunganensis</i>	0.41	0.19	0.21	0.11	2.0		R		E
<i>nuevaensis</i>	0.41	0.18	0.18	0.12	2.3	ls/o	R	G	S
<i>retusa</i>	0.41	0.14	0.24	0.14	1.7	d/o	R	G	HU
sp. PNH 4854	0.41	0.16	0.18	0.08	2.3	d/o	F	G	HE
<i>affina</i>	0.40	0.15	0.10	0.06	4.0	tb/cw	T	C	S
sp. PNH 4936	0.40	0.14	0.11	0.07	3.6	fb/cw	F	G	S
<i>inawaensis</i>	0.40	0.19	0.12	0.13	3.3	ls/o	R	C	S
<i>heuschk.</i> subsp. <i>cajanoae</i>	0.40	0.21	0.20	0.14	2.0	ls/o	R	C	LN
<i>bordenii</i> UC 15829	0.40	0.24	0.16	0.12	2.5	ls/o	R		S

macgregorii	PNH 15541	0.40	0.15	0.15	0.12	2.7	ls/o	F	G	HU
inconspicua		0.40	0.15	0.10	0.04	4.0	l/o	F	C	E ?
sp. pottsii W 8508		0.40	0.22	0.13	0.11	3.1	d/o	RF	C	S
blaschneraezii ssp. carnea	0.40	0.22	0.15	0.13	2.7	ls/o	R	C	S	
nuuuliensis	0.40	0.22	0.13	0.11	3.1	ls/o	RF	G	S	
renuncola	0.40	0.20	0.12	0.13	3.3	d/o	R	C	S	
indentata	0.40	0.12	0.10	0.08	4.0	tb/cw	RT	G	E	
markoi	0.40	0.15	0.12	0.10	3.3	ls/o	R	G	S	
blasher. ssp.	0.40	0.20	0.15	0.15	2.7	ls/o	F	G	S	
eudaimononia										
blasher. ssp. inawaensis	0.40	0.21	0.15	0.15	2.7	d/o	RT	C	S	
sp. PNH 11951 cf.		0.40	0.15	0.17	0.15	2.4	ls/o	T		LS
incrassata										
blasher. ssp. infantaeensis	0.40	0.21	0.18	0.18	2.2	d/o	T	G	S	
blasher. ssp. lagyoensis	0.40	0.17	0.15	0.13	2.7	d/o	RT	C	S	
blasher. ssp. straminea	0.40	0.21	0.17	0.18	2.4	d/o	T	G	S	
blasher. ssp. tangerina	0.40	0.21	0.11	0.15	3.6	d/o	RT	C	HU	
blasher. ssp. truncata	0.40	0.20	0.13	0.14	3.1	d/o	T	G	HU	
blasher. ssp.	0.40	0.20	0.18	0.15	2.2	d/o	T	G	S	
tagumpayensis										
blasher. ssp.	0.40	0.21	0.18	0.12	2.2	d/o	RT	G	S	
lalawinanensis										
blasher. ssp. grandiora	0.40	0.18	0.12	0.12	3.3	p/o	F	G	S	
sp. affinis australis Balasik		0.40	0.17	0.16	0.11	2.5	ls/o	R		HE
scortechinii		0.40	0.21	0.23	0.13	1.7	l/cw	RT	G	LN
odorata PNH 18041 paziae		0.40	0.15	0.20	0.08	2.0	p/o	F	G	LS
querinoensis CAHUP 41946	0.40	0.19	0.20	0.15	2.0	d/o	RT			S
histora CAHUP 5292	0.40	0.15	0.19	0.06	2.1	ls/o	T	C	E	
blaschneraezii ssp.	0.39	0.20	0.13	0.12	3.0	d/o	R	G	S	
nuevavizcayaensis										
blash. ssp. aurantiaca	0.39	0.20	0.19	0.13	2.1	p/o	RT	C	S	
lagyaensis		0.39	0.17	0.10	0.13	3.9	d/o	T	C	S
afuangae		0.39	0.17	0.11	0.10	3.9	d/o	T	C	S
polystachya Java		0.39	0.16	0.15	0.12	2.6	d/o	RT	G	S
moninae	0.39	0.17	0.11	0.05	3.5	d/o	R			S
mamagongensis	0.39	0.18	0.16	0.13	3.9	d/o	T	C	S	
ferrerasi	0.39	0.18	0.18	0.10	2.2	d/o	T	C	LS	
tagumpayensis		0.39	0.17	0.09	0.12	4.3	d/o	F	C	S
wayetii ssp. lagyoensis		0.39	0.17	0.10	0.10	3.9	fb/cw	F	C	R
blaschneraezii ssp. siariae	0.39	0.29	0.15	0.14	2.6	d/o	T	G	S	
kamangongensis		0.39	0.19	0.15	0.12	2.6	d/o	R	C	S
littoralis IML 708		0.39	0.15	0.15	0.06	2.6	fb/o	F	G	HS
verticillata	0.39	0.18	0.18	0.10	2.2	ls/o	T	G	S	
indaysarahae	0.39	0.11	0.21	0.13	1.9	ls/o	F	C	HE	
blasher. ssp. vadacorolla	0.38	0.20	0.16	0.14	2.4	d/o	R	C	S	

	0.38	0.15	0.12	0.12	3.2	d/o	R	G	HU
eburna ssp. infantaensis	0.38	0.15	0.12	0.12	3.2	d/o	R	G	S
CAHUP 5269	0.38	0.15	0.11	0.07	3.5	d/o	RF		
blasher. ssp. aurantiaca	0.38	0.20	0.16	0.15	2.4	ls/o	R	S	
columna	0.38	0.16	0.09	0.10	4.2	p/o	RT	G	HU
sulu-anensis	0.38	0.16	0.17	0.09	2.2	d/o	RT	G	2S
CAHUP 63826	0.38	0.15	0.16	0.07	2.4	p/o	R		2S
ignota	0.38	0.16	0.20	0.09	1.9	fb/cw	T	C	R
lasiantha	0.38	0.13	0.19	0.08	2.0	ls/o	R	G	LS
maximowayetii	0.38	0.15	0.16	0.13	2.4	ls/o	T		R
nummularioides	0.38	0.12	0.15	0.09	2.5	fb/cw	F		R
panayensis	0.37	0.14	0.13	0.07	2.8	fb/cw	F	G	S
baguioensis	0.37	0.14	0.16	0.12	2.3	ls/o ?	RT		S
sp. CAHUP 5293-5392	0.37	0.16	0.19	0.15	1.9	ls/o ?	R		S
sp. PNH 39370	0.37	0.16	0.12	0.11	3.1	ls/o	RT		HU/
CAHUP 41945	0.37	0.16	0.20	0.13	1.9	p/o	R	G	S
mata-ole-afiensis	0.37	0.18	0.15	0.12	2.5	ls/o ?	R		
NS005	0.37	0.16	0.18	0.13	2.1	p/o	R	G	S
blasfern. ssp. mendozae	0.37	0.22	0.13	0.13	2.8	d/o	R	C	S/HU
lacunosa	0.37	0.14	0.10	0.06	3.7	fb/cw	F	C	R
brevialata	0.37	0.14	0.11	0.06	3.4	fb/cw	FT	G	S
coronarosea	0.37	0.15	0.18	0.16	2.1	fb/cw	F	G	S
santafeensis	0.37	0.15	0.10	0.06	3.7	fb/cw	F	C	WH
lambioae	0.37	0.15	0.10	0.10	3.7	d/o	T	C	S
multisepala	0.37	0.18	0.16	0.14	2.3	ls/o	R	C	S
rima	0.37	0.14	0.08	0.07	4.6	fb/cw	T	C	S
blasher. ssp. armerina	0.37	0.19	0.16	0.14	2.3	d/o	R	G	S
baguioensis	0.37	0.14	0.16	0.12	2.3	ls/o	RT		HU
IPPS 8860	0.37	0.13	0.15	0.09	2.5	d/o	R	G	S
UC-BO 32378 where ?	0.37	0.14	0.13	0.07	2.8				
tomatoensis	0.37	0.16	0.08	0.09	4.6	d/o	R	C	S
blasher. ssp.	0.36	0.20	0.13	0.13	2.8	d/o	R	C	S
kamagongensis									
sp. UC 424 Zamboanga	0.36	0.15	0.12	0.15	3.0	fb/cw	T		HU
spartiodes	0.36	0.23	0.25	0.25	1.4	l/r	R	G	HU
blasher. ssp.	0.36	0.20	0.10	0.14	3.6	ls/r	T	G	S
nagcarlanensis									
blasher. ssp. parviora	0.36	0.21	0.15	0.15	2.4	d/o	T	G	LH
blasher. ssp.	0.36	0.20	0.10	0.17	3.6	ls/o	R	C	HU
taywanensis									
sipitangensis	0.36	0.09	0.06	0.04	6.0	fb/cw	F	C	S
burtoniae	0.36	0.14	0.07	0.05	5/1	fb/cw	T	C	S
poolei	0.36	0.14	0.13	0.06	2.8	fb/cw	T	C	S
lacunosa var. pallida	0.36	0.14	0.09	0.05	4.0	fb/cw	T	G	R
geotropa	0.36	0.13	0.20	0.07	1.8	fb/cw	RT	C	S?
tangerina	0.36	0.13	0.06	0.06	6.0	fb/cw	RT	G	S
papaschonii	0.36	0.10	0.08	0.06	4.5	l/o	R		E ?

blasher. ssp. karencaseae	0.35	0.23	0.12	0.15	2.9	ls/o	T	C	S
blasher. ssp. simeonae	0.35	0.20	0.14	0.14	2.5	d/o	F	C	S
blasher. ssp. marizae	0.35	0.20	0.15	0.10	2.3	ls/o	T	C	LH
concava CAHUP 5991	0.35	0.13	0.14	0.12	2.5	ls/o	T		HU
apoensis var. sagittaria	0.35	0.08	0.13	0.08	2.7	fb/cw	R	G	2S
bebsguevarrae	0.35	0.12	0.10	0.08	3.5	p/o	F	C	S
bicolensis	0.35	0.15	0.08	0.08	4.4	p/o	RT		S
mitisa	0.35	0.12	0.11	0.05	3.2	fb/cw	F	C	E
carmelea	0.35	0.16	0.17	0.11	2.1	ls/o ?	F		HE
eburna ssp. rosea	0.35	0.15	0.08	0.10	4.4	ls/o	R	G	S
eitapensis	0.35	0.15	0.10	0.09	3.5	fb/o	RT	G	LS
ginabrigidana	0.35	0.14	0.06	0.09	5.8	ls/o	R	G	S
crassicaulis Type 14440	0.35	0.14	0.15	0.08	2.3	ls/o	T	C	E
samarensis ssp.	0.35	0.18	0.17	0.15	3.1	ls/o	F		S
gutierrezii									
sp. polystachya alba	0.35	0.19	0.18	0.11	1.9	d/o	RF	G	S
parviflora	0.35	0.14	0.10	0.08	3.5	ls/o ?	F		S
pseudolitoralis	0.35	0.14	0.12	0.05	2.9	fb/cw	F	C	S
pseudoleytensis ssp.	0.35	0.13	0.10	0.08	3.5	fb/cw	RT	C	S
majora									
crassicaulis	0.35	0.13	0.15	0.08	2.3	ls/o	T	C	E
davidcummingii	0.35	0.17	0.30	0.10	1.2	fb/cw	T	G	HE
foliapalmata	0.35	0.17	0.13	0.11		ls/o	R	G	HU
salmonea	0.35	0.14	0.10	0.10	2.5	d/o	T	G	S
salmonea ssp. pallida	0.35	0.17	0.10	0.15	3.5	p/o	T	G	S
foliapalmata	0.35	0.17	0.13	0.11	2.7	ls/o	R	G	HU
blasher. ssp. luzonensis	0.34	0.22	0.12	0.13	2.8	d/o	T	C	S
corazoniae	0.34	0.12	0.10	0.09	3.4	fb/cw	RT	C	HE
heusch. ssp. mendozae	0.34	0.18	0.17	0.11	2.0	ls/o	R	C	HE
setsukokobayashiae	0.34	0.13	0.08	0.04	4.3	fb/cw	RT	C	S
tsangii	0.34	0.13	0.18	0.10	1.9	fb/cw	T	G	S
krohniana	0.34	0.13	0.09	0.04	3.8	fb/cw	TF	C	S
as brittonii	0.34	0.15	0.06	0.07	5.7		T		
navicula	0.34	0.15	0.17	0.11	2.0	ls/o	RT		S
nummularioides (pink)	0.34	0.12	0.15	0.09	2.3	fb/cw	F	G	R
krohniana ssp.	0.33	0.14	0.08	0.06	4.1	fb/cw	TF	G	HB
lalawinanensis									
auroraensis	0.33	0.15	0.10	0.09	3.3	ls/o	RT		S
samarensis	0.33	0.14	0.14	0.11	1.7	ls/o	T		S
coronarubra	0.33	0.16	0.10	0.12	3.3	ls/o	T	G	S
apoensis	0.32	0.16	0.08	0.06	2.5	fb/cw	TF	C	S
diptera	0.32	0.16	0.13	0.06	2.5	ls/o	R	C	S
latifolia	0.32	0.15	0.16	0.10	2.0	ls/o	RF	G	S
odetteae	0.32	0.12	0.09	0.08	3.6	fb/cw	T	G	S
taywanensis	0.32	0.12	0.09	0.10	3.6	fb/cw	F	G	S
pseudoleytensis	0.32	0.15	0.05	0.08	6.4	fb/cw	F	C	S

blasher. ssp. rosea AC #5	0.32	0.15	0.15	0.10	2.1	d/o	R		S
marquisii	0.32	0.15	0.22	0.14	1.5	ls/o	R	C	E
acanthocitrina	0.32	0.12	0.08	0.08	2.5	fb/o	T	C	S
capatata	0.32	0.12	0.09	0/08	3.6	l/cw	T	C	S
biespada	0.31	0.13	0.15	0.04	2.1	fb/o	T	C	HU
heusch. ssp. marionii	0.31	0.17	0.18	0.13	1.7	ls/o	R	C	R
sp. IML 850 affin.	0.31	0.17	0.18	0.11	1.7	ls/o	T		S
Macgregori									
camphorifolia (wrong)	0.31	0.15	0.08	0.08	3.9	ls/o	T		S
Lisa V-2	0.31	0.11	0.16	0.05	1.9	fb/o	F	G	E
realensis	0.31	0.11	0.11	0.04	2.8	fb/cw	F	C	E
tangerina	0.31	0.13	0.06	0.06	5.2	fb/cw	RT	G	S
memoria	0.31	0.11	0.05	0.05	6.0	fb/cw	F	C	S
heuschkeliana	0.30	0.15	0.15	0.15	2.0	fb	T	C	R
loheri ssp. tawanensis	0.30	0.15	0.07	0.12	4.3	Tru.	T	C	HU
william. subsp.	0.30	0.11	0.10	0.07	3.0	ls/o	R	G	S
calendulina									
walliniana	0.30	0.13	0.10	0.04	3.0	l/o	F	C	S
bifunda ssp. integra	0.29	0.14	0.06	0.09	4.8	l/o	R	C	S
IML 232 Kuching.	0.29	0.12	0.06	0.05	4.8	fb/cw	T	C	S.
pallilimba	0.29	0.12	0.08	0.05	3.6	fb/cw	T	C	LS
nyhuusiae	0.29	0.13	0.11	0.07	2.6	p/o	R	C	S
bifunda ssp. obtusa	0.29	0.13	0.06	0.08	4.8	d/o	R	G	S
IPPS 8870	0.29	0.10	0.13	0.10	2.2	l/cw	R	C	HU
subrosea	0.28	0.15	0.09	0.08	3.2	p/o	R	G	S
aurea ssp. nagcarlensis	0.28	0.09	0.08	0.06	3.5	fb/cw	R	C	S
cyclaminea	0.28	0.12	0.06	0.04	4.7	ls/o	R	G	S
nabawanensis	0.28	0.12	0.17		1.6	fb/cw	T	C	LS
pinnata	0.28	0.12	0.10	0.07	2.8	p/o	T	G	S
barbonii	0.28	0.11	0.13	0.04	2.2	lb/cw	T	C	LS
hirsuta	0.27	0.11	0.06	0.03	4.5	fb/cw	T	C	LS
CAHUP 9035	0.27	0.10	0.13	0.10	2.1		T		S
Bada TG	0.27	0.11	0.06	0.06	4.5	fb/cw	F	G?	S
trista	0.27	0.12	0.06	0.06	4.5	p/o	F	G	HU
viscayaensis	0.27	0.10	0.08	0.08	3.4	ls/o	RF	G	HU
celsa	0.26	0.10	0.12	0.09	2.2	fb/cw			S
nakarensis	0.26	0.13	0.06	0.09	4.3	d/o	R	G	HU
bakerensis	0.26	0.10	0.10	0.08	2.6	ls/o	RT		S?
rosarioae	0.26	0.07	0.11	0.04	2.4	fb/o	T	C	LS
affinis MR	0.26	0.11	0.08	0.03	3.3				LS
sp. F-428 Kuching Borneo	0.26	0.14	0.07	0.04	3.7	fb/cw	F		
sp. TN 99-002	0.26	0.12	0.08	0.05	3.3	fb/cw	F	C	LS
unica	0.26	0.10	0.05	0.04	5.2	fb/cw	T	C	LS
unica ssp. aurantiaca	0.26	0.10	0.06	0.08	4.3	fb/cw	T	C	LS
albida	0.25	0.09	0.10	0.08	2.5	d/o	R	G	S
maubanensis	0.25	0.13	0.08	0.09	3.1	d/o	R	C	S

marananiae	0.25	0.13	0.05	0.06	5.0	ls/o	R		HU
nakarensis ssp. cadmia	0.25	0.12	0.06	0.10	4.2	ls/o	R	G	S
lagyoensis	0.25	0.10	0.06	0.08	4.2	ls/o	RT	C	S
neuvaensis	0.25	0.10	0.08	0.04	3.1	fb/cw	T	C	LS
revoluta	0.25	0.11	0.05	0.05	5.0	fb/cw	T	C	S
yapiana	0.25	0.12	0.06	0.04	4.2	fb/o	T	C	LS
IPPS 1779	0.25	0.09	0.06	0.05	4.2	fb/o	F	G	S
aurea	0.24	0.07	0.04	0.04	6.0	fb/cw	T	G	S
leticiae	0.24	0.10	0.04	0.02	6.0	fb/o	T	C	HH
unruh. ssp. maubanensis	0.24	0.14	0.05	0.08	4.8	p/o	T	C	HH
martinii ssp.	0.24	0.12	0.07	0.08	3.2	ls/o	RT	G	HU
deorsa	0.24	0.09	0.06	0.07	4.0	ls/o	R	G	S
marvinii	0.24	0.08	0.07	0.03	3.4	fb/cw	RF	C	R
martinii	0.24	0.10	0.07	0.05	3.4	ls/o	F	C	S
acanthodissimila	0.24	0.10	0.04	0.12	6.0	ls/o	T	C	R
sp. s.n. Taylor UC	0.24	0.10	0.08	0.05	3.0	l/o	RT		S
unruhiana	0.24	0.11	0.09	0.07	2.2	p/o	R	G	S
subrosea ssp. inawaensis	0.23	0.14	0.08	0.12	2.9	ls/o	R	G	HU
acanthominima	0.23	0.10	0.07	0.07	2.9	fb/cw	F	C	S
acanthotrunca	0.23	0.13	0.06	0.06	3.8	t/cw	T	G	S
bifunda	0.23	0.10	0.06	0.06	3.8	l/o	R	C	HU
maria-elisae	0.23	0.10	0.09	0.07	2.6	s/o	T		S
cupa	0.23	0.12	0.06	0.06	3.8	ls/o	RT	G	S?
engleriana			0.23	0.10		l/cw			R
taeahwa ssp.	0.23	0.12	0.06	0.04	3.8	fb/cw	T	C	R
tayuncensis									
nagcarlanensis	0.23	0.11	0.07	0.04	2.9	fb/cw	T	C	LS
taeahwa	0.23	0.08	0.07	0.04	2.9	fb/cw	FT	C	LS
caespitosa	0.22	0.05	0.08	0.04	2.9	fb/cw	Y	G	LS
bulba	0.22	0.07	0.07	0.07	3.1	fb/cw	RF	C	S
capotoanensis	0.22	0.05	0.15	0.10	1.5	ls/o	R		LS
capotoanensis ssp.	0.22	0.12	0.07	0.08	3.1	ls/o	R	C	HU
quezone.									
liquida	0.22	0.09	0.07	0.03	3.1	fb/cw	T	C	R
linguiforma	0.22	0.09	0.07	0.04	3.1	fb/cw	P	C	LS
acanthopenta	0.22	0.11	0.07	0.07	3.1	fb/cw	F		S
bilobata Ben H, TG	0.22	0.08	0.06	0.05	3.7	fb/cw	F		S
bilobata red edge	0.22	0.09	0.07	0.06	3.1	fb/cw	RF		S
cupula	0.21	0.08	0.05	0.07	4.2	fb/cw	T	G	S
rosarioae ssp. realensis	0.21	0.10	0.05	0.04	4.2	fb/cw	T	C	S
bilobata Monina 1	0.21	0.11	0.04	0.05	5.3	fb/cw	F		S
leytensis IML 228 ck 0.48	0.21	0.10	0.08	0.06	2.6	fb/cw	F	C	R
unica ssp. bakerensis	0.21	0.07	0.07	0.03	3.0	lb/cw	TF	C	E
carandangiana	0.21	0.09	0.07	0.09	3.0	lb/cw	RT	C	S
unica ssp. curvata	0.21	0.10	0.07	0.06	3.7	fb/cw	RT		S?

brittonii	0.19	0.08	0.05	0.04	3.8	fb/cw	F	G	S
picta Miq.	0.20	0.08	0.06	0.04	3.3	fb/cw	FT	G	S
pubicupula	0.20	0.09	0.03	0.04	6.7	fb/cw	Y	G	S
amorosoae	0.20	0.09	0.05	0.05	4.0	fb/cw	F		S ?
williamsiana	0.20	0.10	0.07	0.08	2.9	d/o	T	C	S
bilobata	0.19	0.09	0.09	0.05	2.1	fb/cw	F		S
bilobata	0.19	0.08	0.05		3.8	fb/cw	RF	G	S
bilobata Monina 2	0.19	0.09	0.05	0.03	3.8	fb/o	F		S
minuta	0.19	0.08	0.06	0.06	3.3	lb/cw	R	C	S
sp. DS 1	0.19	0.08	0.05	0.05	3.8	fb/cw	F	G	S
artwhistlerii	0.19	0.08					RT		
tingkoyanensis	0.18	0.10	0.10	0.04	1,8	new	T		
kannana	0.15	0.06	0.06	0.05	2.5	fb/cw	T		S
minimapollinaria	0.15	0.06	0.06	0.07	2.5	lb/cw	T		S
minimapollinia AC #003	0.15	0.11	0.07	0.09	2.1	ls/o			S
reyesii	0.15	0.05	0.05	0.03	3.0	fb/cw	R	C	HU
parvapollinia	0.12	0.10	0.08	0.07	1.2	ls/o	T	G	S

Pollinia Types 2018-1

ls/o or ls/r

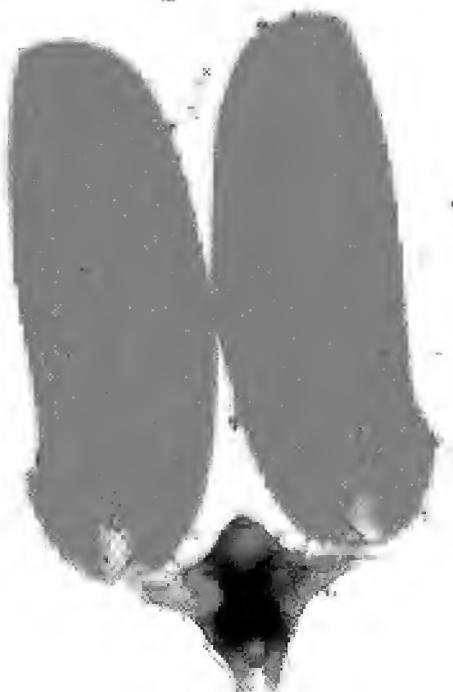
Listed below by pollinia length: red = unpublished but described

1. **Hoya archboldiana** Norman 1937
2. **Hoya macgillivrayi** Bailey 1914
3. **Hoya multiflora** Blume 1823
4. **Hoya albiflora** Zipp. ex Blume 1848
5. **Hoya onychoides** P. I. Forster & Liddle 1995
6. **Hoya coriacea** Blume 1826
7. **Hoya lobii** Hooker f. 1883
8. **Hoya amrita** Kloppenburg, Siar & Ferreras 2011
9. **Hoya imperialis** Lindley 1846
10. **Hoya a pubicorolla** subsp. **glabrapedicila** Kloppenburg & Mendoza
11. **Hoya coriacea** subsp. **philippinensis** Kloppenburg, Siar, & Ferreras 2013
12. **Hoya odorata** Schlechter 1906
13. **Hoya chunii** P. T. Li. 1984
14. **Hoya stoneana** Kloppenburg & Siar 2006
15. **Hoya darwinii** Loher 1910
16. **Hoya lazaroni** Kloppenburg & Siar 2007
17. **Hoya skinneriana** Kloppenburg & Siar 2011
18. **Hoya** sp. **salweenica**
19. **Hoya meliflua** Blanco ex Merrill 1837
20. **Hoya** cf. **halconensis** Kloppenburg 1990 NS 505 225
21. **Hoya celata** Klopp., Siar, Mendoza Cajano Guevarra & Carandang 2013
22. **Hoya darwinii** subsp. **mabilogensis** Kloppenburg & Mendoza
23. **Hoya meliflua** subsp. **fraterna** Green 1995
24. **Hoya odorata** Schlechter 1906
25. **Hoya megalaster** Warburg 1901
26. **Hoya loyceandrewsiae** Green 1995
27. **Hoya irisae** Ferreras, Kloppenburg & Tandang 2014
28. **Hoya desvoeuxensis** Green & Kloppenburg 2012
29. **Hoya** sp. PNH 9385
30. **Hoya buotii** Kloppenburg 2002
31. **Hoya pubicorolla** Kloppenburg 2013
32. **Hoya australis** subsp. **australis** Trail 1989
33. **Hoya meliflua** subsp. **mendozae** Kloppenburg
34. **Hoya** sp. CI #3
35. **Hoya thompsonii** Hooker f. 1883
36. **Hoya motoskei** Teijsmann & Binnend 1852
37. **Hoya** sp. UC 49238
38. **Hoya excavata** Teijsmann & Binnendijk 1863
39. **Hoya arnottiana** Wight 1843
40. **Hoya** sp. 297 ex India
41. **Hoya** sp. BSI #1

42. *Hoya* sp. Thailand
 43. ***Hoya meliflua* subsp. *escobinae*** Kloppenburg 2016
44. (NOT) *Hoya apiculata* Scheff. 1896
 45. *Hoya carnosa* R. Brown 1802 (white flower)
 46. ***Hoya odorata* subsp. *antoinensis*** Kloppenburg 2015
 47. *Hoya paziae* Kloppenburg 1990
 48. *Hoya carnosa* R. Brown 1802
 49. *Hoya cumingiana* Decaisne 1844
 50. ***Hoya corollamarginata*** Kloppenburg 2017
51. *Hoya fetuana* subsp. *sigeleensis* Kloppenburg 2017
52. *Hoya rupicola* Hill 1988 *australis* subsp.
 53. *Hoya subquintuplinervis* Miquel 1869
 54. *Hoya fungii* Merrill 1934
 55. *Hoya greenii* Kloppenburg 1995
 56. ***Hoya australis* subsp. *oramicola*** Forster & Liddle 1991
57. *Hoya hernaezii* Kloppenburg 2016
 58. ***Hoya australis* subsp. *nathalieae*** Kloppenburg & Siar 2011
 59. *Hoya odorata* Schlechter, UC 14519
 60. *Hoya pubicenta* Kloppenburg, Mendoza & Ferreras 2014
 61. *Hoya pubicorolla* Kloppenburg, Mendoza & Ferreras 2013
 62. *Hoya vitiensis* Turrill 1915
 63. *Hoya* sp. India #3
 64. ***Hoya odorata* subsp. *garciae*** Kloppenburg 2015
 65. *Hoya serpens* Hooker f. 1883
 66. *Hoya* sp. Fresno Palmate
 67. ***Hoya chlorantha* var. *tutuilensis*** Christophersen 1975
 68. ***Hoya nicholsoniae*** Muller 1866
 69. *Hoya* sp. CI #3
 70. ***Hoya naumanii*** Schlechter 1908
 71. *Hoya* sp. Balasik Is. Sulawesi TG # 94112
 72. ***Hoya santiagoi* subsp. *mandozae*** Kloppenburg 2013
 73. ***Hoya betchei* (Schltr.) Whistler W 3245**
 74. *Hoya* sp. Bangkok 4
 75. ***Hoya dolichosparte*** Schlechter 1916
 76. ***Hoya gildingii*** Kloppenburg 2001
 77. ***Hoya cumingiana*** Decaisne 1844
 78. ***Hoya acuta*** Haworth 1821
 79. ***Hoya vitiensis*** Turrill 1915
 80. ***Hoya odorata*** Schlechter, UC 13860
 81. *Hoya* sp. Sulawesi Medium flower
 82. ***Hoya minipollinia*** Kloppenburg & Cajano

Hoya archboldiana Norman 1937

The pollinarium enlarged approximately 48 times. Note here the enlargement of the sterile edge as it approaches the inner end of the pollinia. The relatively narrow and cupped translator arms and the very small clear caudicle. The dark retinacula is broad of definite shape with the lower divided end. The orifice in the side of the retinaculum just above the waist area is plainly visible.



Pollinarium

Pollinium

length	1.72 mm
width	

Retinaculum

length	0.26 mm
shoulder	0.30 mm
waist	0.16 mm
hip	0.22 mm
extensions	0.12 mm

Translators

length	0.31 mm
depth	0.03 mm
width	0.04 mm ca.

Caudicle

bulb diam.	0.10 mm
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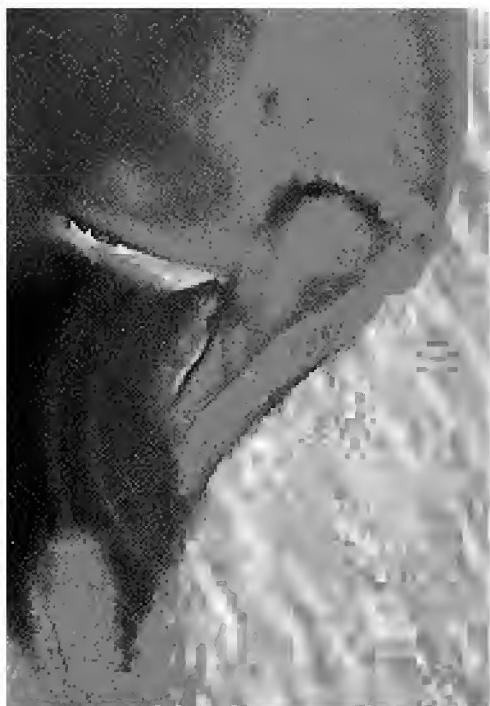
Translator/caudicle type: ls/o

Pollinia inner end type: R

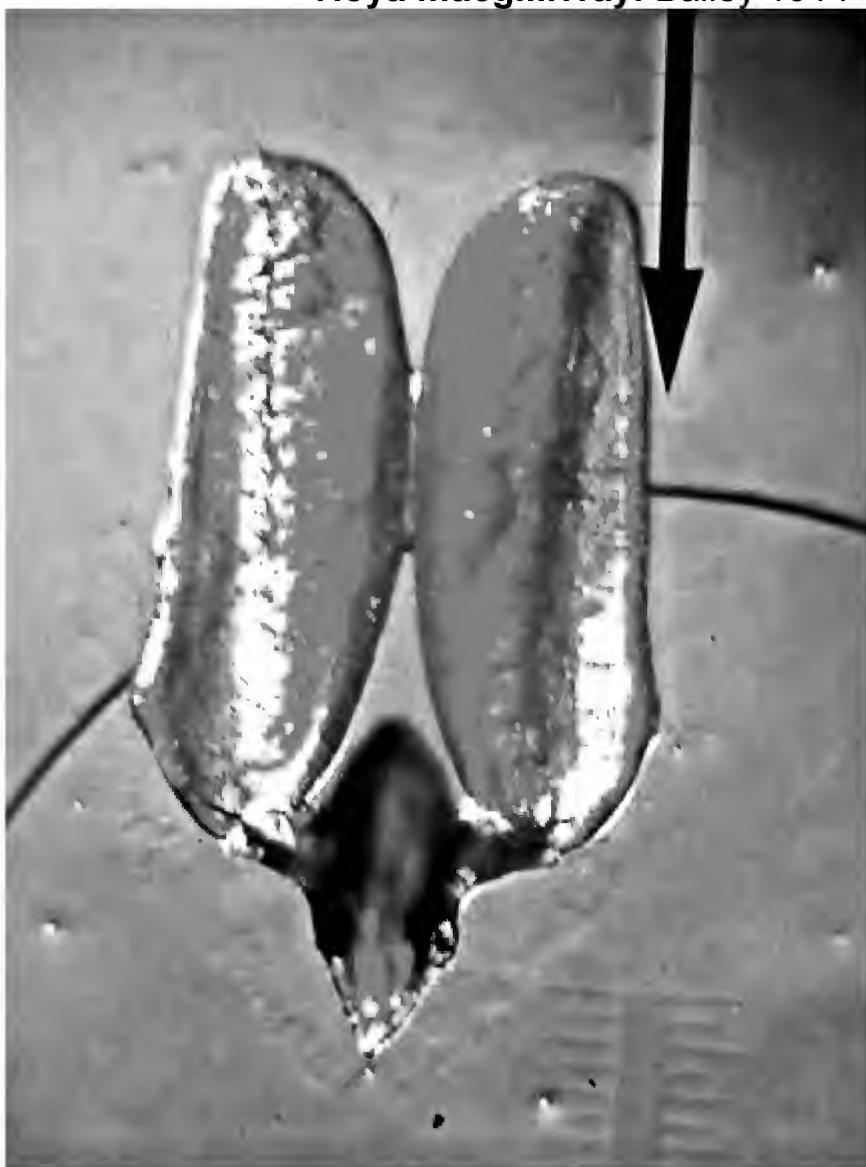
Caudicle bulb: granulate G

Retinacula character: S

This is an enlargement of the side of the retinaculum approx. 165x. This shows clearly how the relatively clear, sticky caudicle is cradled by the concave top of the translator arm. The lower end of the pollinium is at the upper side of the picture, and a portion of the retinaculum at the lower left side.



Hoya macgillivrayi Bailey 1914



Pollinarium
enlarged about
165x.

Pollinium

length	1.35 mm
widest	0.43 mm

Retinaculum

length	0.60 mm
shoulder	0.40 mm
waist	0.30 mm
hip	0.35 mm
ext	0.08 mm

Translator/caudicle type: ls/o

Pollinia inner end type: R

Base: FL

Caudicle bulb: clear

Retinacula character: HE

Translator

length	0.20 mm
depth	0.04 mm

Caudicle bulb diam. 0.16 mm

Hoya multiflora Blume 1823

Flowered at Fresno, CA. from silvered leaf clone labeled "True".



Pollinaria of green
Rt. and true left enlarged
about 64x.

True form:

Pollinia

length	1.27 mm
widest	0.28 mm

Retinaculum

length	0.20 mm
shoulder	0.18 mm
waist	0.07 mm
hip	0.12 mm
ext.	0.07 mm

Translator

length	0.22 mm
depth	0.03 mm

Caudicle

bulb. diam. 0.10 mm

Translator/caudicle type:
ls/o

The green form is smaller.

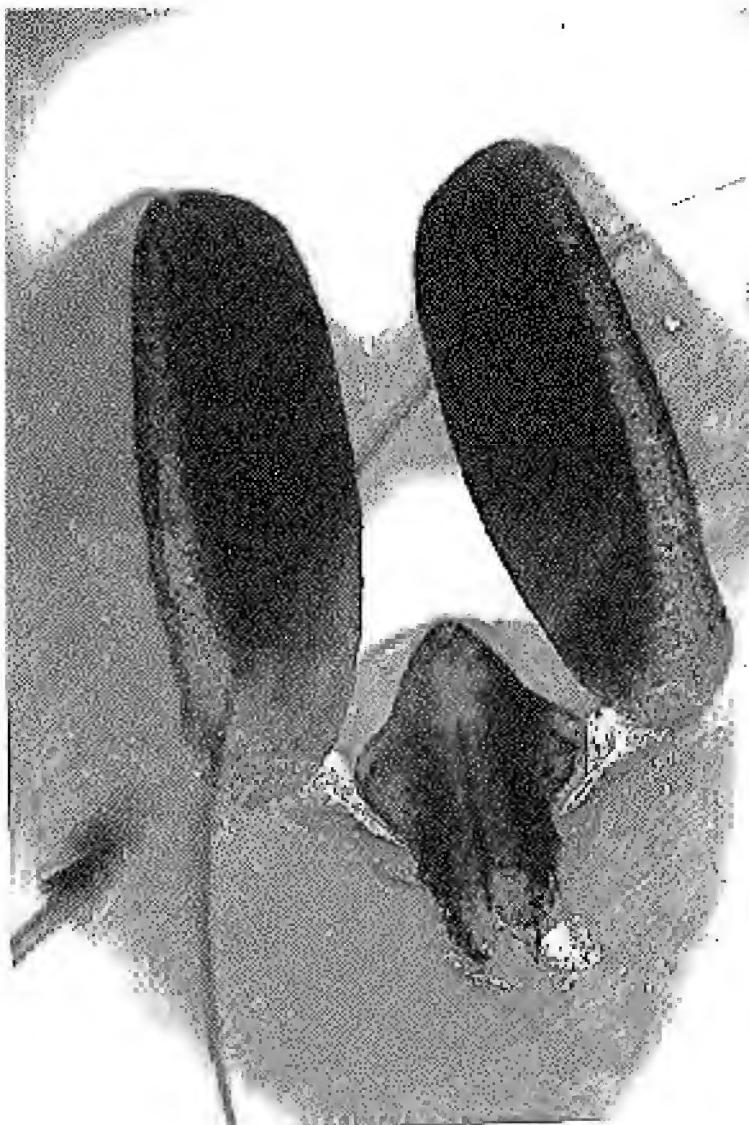
Pollinia inner end type: R

Caudicle bulb: ?

Hoya albiflora Zipp. ex Blume 1848

Pollinarium enlarged only about 65 times so you see how relatively large it is, it is among the biggest. It has a well-developed retinaculum and distinct translator arms supporting clear caudicles. The type description says "base crural (end) glued to the retinaculum" of course this is never the case. The end are glued by the clear bulbous caudicles which in turn are supported by the more structured translator arms, which are wedge shaped structures with slightly convex tops into which the tale end of the caudicle rests.

Pollinarium: large, well formed with long translators and large caudicles. Here the caudicle has surface granulations whereas in most cases it is clear.



Pollinium:

length	1.22 mm
widest	0.45 mm

Retinaculum

length	0.61 mm
shoulder	0.50 mm
waist	0.22 mm
hip	0.22 mm
extensions	0.18 mm

Translators

length	0.25 mm
depth	0.04 mm

Caudicles

bulb	0.09 mm
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Translator/caudicle type: ls/o

Pollinia inner end type: R

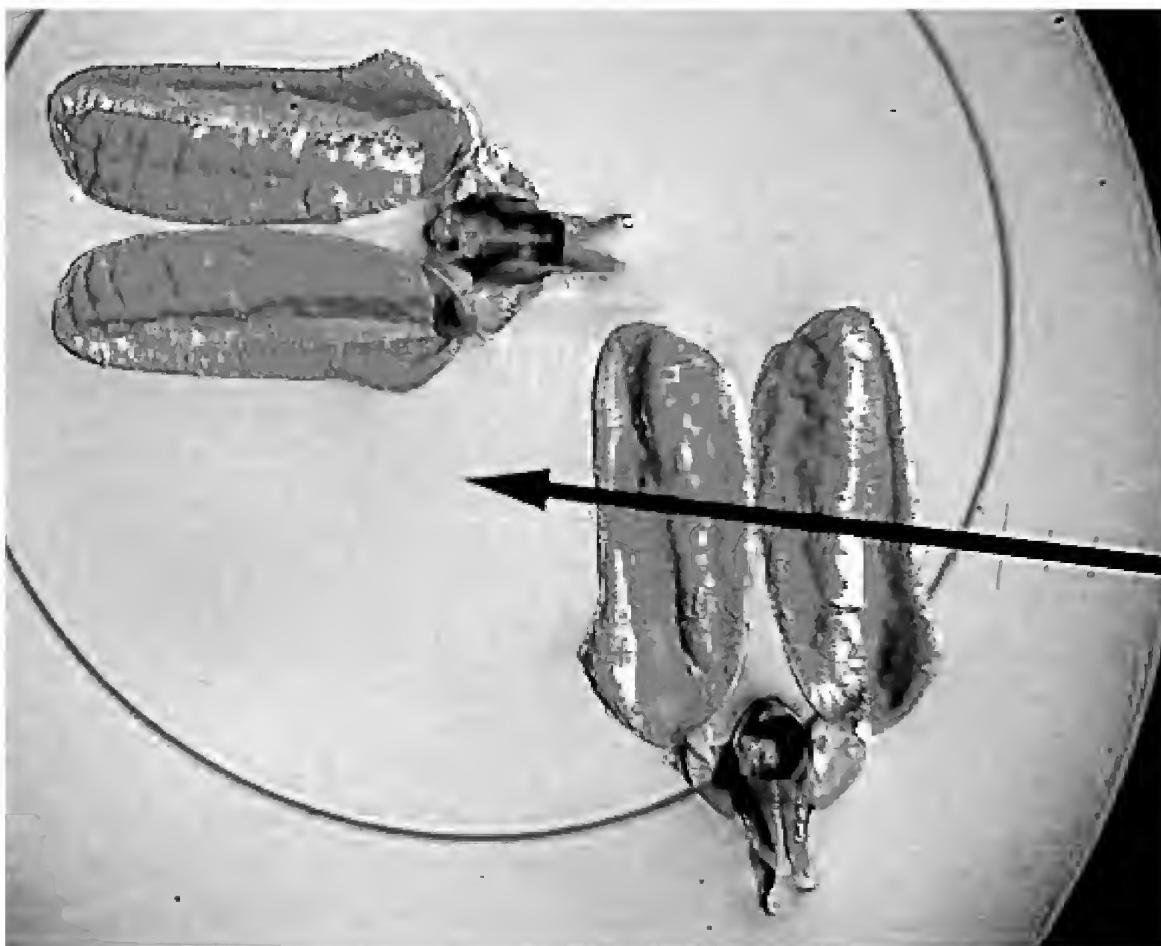
Caudicle bulb: granulate G

Retinacula character: S

Enlarged ca. 165x. This is the most massive pollinarium I have examined!

Hoya onychoides P. I. Forster & Liddle 1995

Flowers sent by Torill Nyhuus in March 2007 in liquid. Data 4/14/07
Pollinaria enlarged about 85x.



Pollinium

length	1.09-1.14 mm
widest	0.38 – 0.40 mm

Retinaculum

length	0.35 mm
shoulder	0.30 mm
waist	0.23 mm
hip	0.24 mm
ext.	0.20 mm

Pollinia inner end type: R

Caudicle bulb: clear C

Translator/caudicle type: ls/o

Retinacula character: P

Translator

length	0.25 mm
widest	0.07 mm

Caudicle bulb diam. 0.10 mm

***Hoya coriacea* Blume 1826**

Flower from Ann Wayman 8/92



This is a photomicrograph of the Pollinarium at only about 65 magnifications. It is large so taken at 165x it is only partially visible. The general features are visible here. The long regular rounded ended pollinia and the long rather linear retinaculum and also the long translator arms supporting the clear bulbous caudicles.

To the right is a photo enlarged about 165 x. This pollinarium is very distinctive. Note that the translators are attached between the waste and hips of the retinaculum, which is long and relatively narrow, the hips already well down the structure. The translator although more densely cellular is not as distinct from the caudicle as in most *hoya*



species, and the caudicle is also cellular like structured. Here it can be seen that the pellucid sterile edge of the pollinia ends inwardly in an apiculate protrusion just above where an orifice exists on the outer edge of the pollinia which allows nectar to enter the pollinium. The translators and caudicles are always attached to the retinaculum in a whole in the side of the retinaculum (an internal attachment).

Pollinaria: Pollinia 1.08 mm long 0.30 mm widest. Retinaculum 0.59 mm long. Caudicle 0.35 mm long. Translator: 0.52 mm long curved.

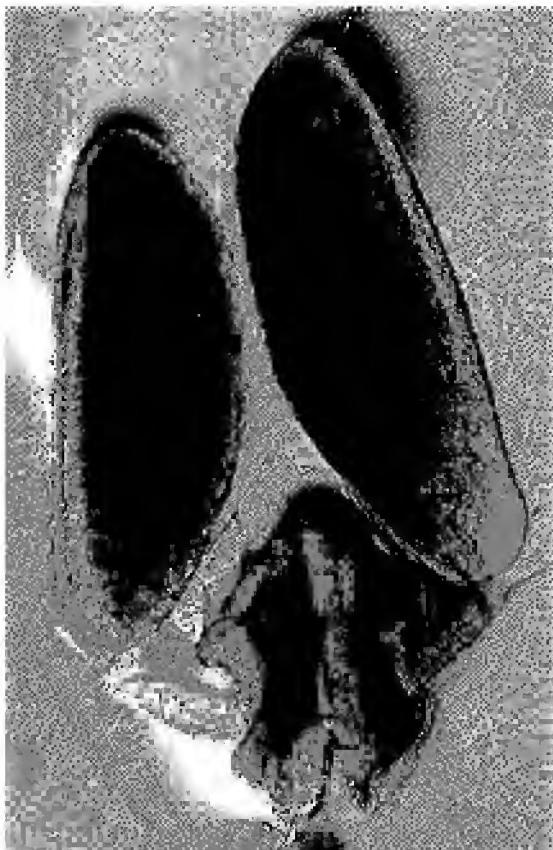
Pollinia inner end type: R

Translator/caudicle type: ls/o

Caudicle bulb: granulate

Retinacula character: E

Hoya lobii Hooker f. 1883
from C.T. in Thailand



The pollinarium here enlarged about 65x, so this is a large pollinarium. The apical lobes of the pollinia are rounded and taper inwardly. There is a broad extension on the lower outside of the pollinia, which is also seen in pollinaria of some species labeled *Hoya odorata* Schlechter and also *Hoya vitiensis* Turrill.

The retinacula here is really broad and short with extended shoulder area narrow waist and flaring hip areas. The translators extend outwardly and support a rather large bulbous yellowish caudicle.

Pollinaria: this is one of the larger pollinaria.

Pollinia

length	1.06 mm
widest	0.40 mm well down the side.

Retinaculum

length	0.50 mm to the crotch.
shoulder	0.47 mm wide
hip	0.25 mm
waist	0.38 mm wide.
extensions	0.17 mm long.

Translator

length	0.30 mm
depth	0.10 mm

Caudicle

bulb diam. 0.14 mm

Translator/caudicle type: ls/o

Pollinia inner end type: T

Caudicle bulb: granulate

Retinacula character: S

Hoya amrita Kloppenburg, Siar & Ferreras 2011 Type clone



Pollinium

length 1.05 mm
widest 0.28 mm

Retinaculum

length 0.35 mm
shoulder 0.22 mm
waist 0.10 mm
hip 0.10 mm
ext. none

Translator

length 0.10 mm
depth 0.01 mm

Caudicle

bulb diam. 0.08 mm

Translator

Caudicle Type:
ls/o

Pollinia inner end
type: R

Caudicle bulb:
clear C

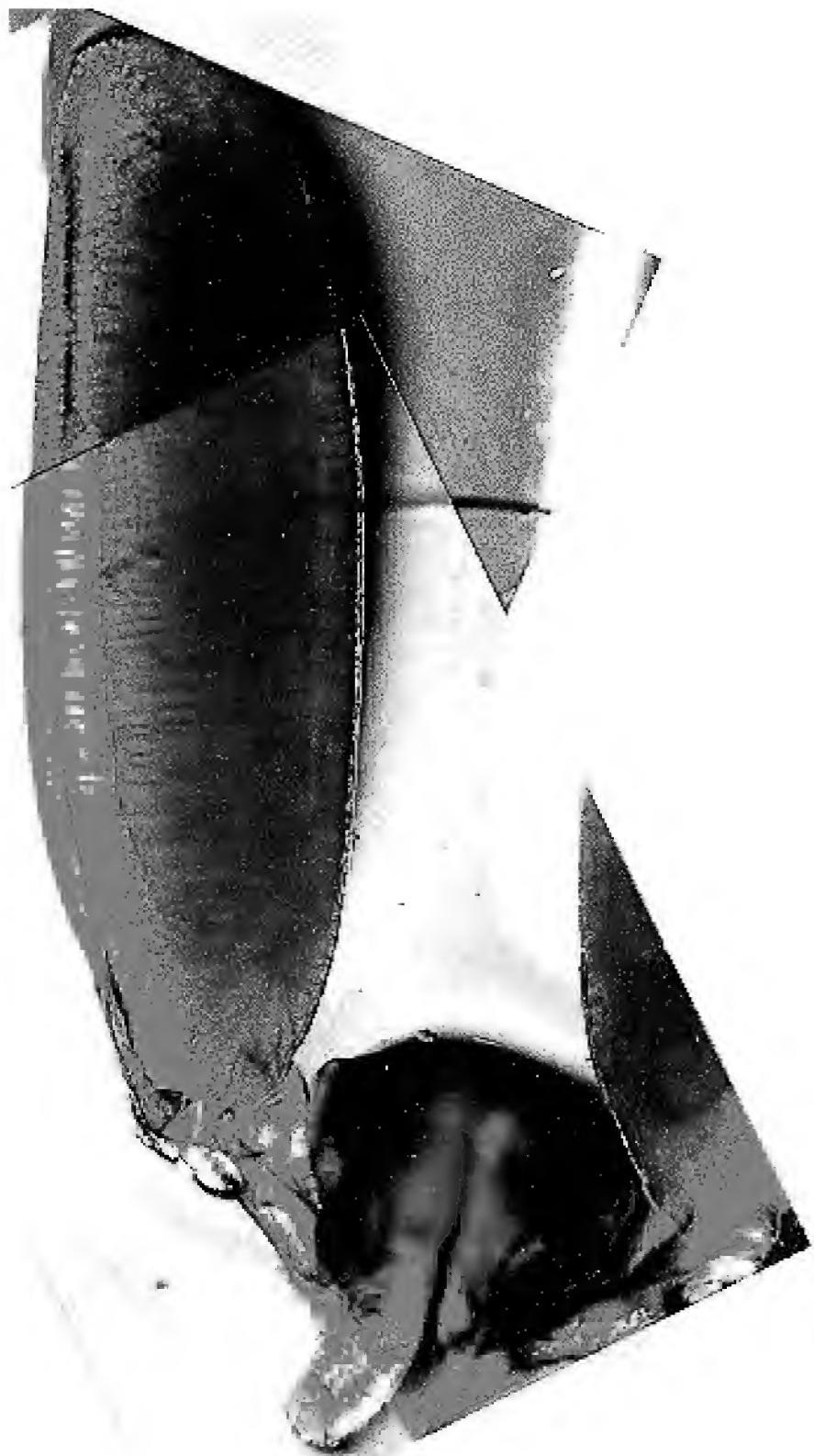
Retinacula
character: HE

The retinaculum here is turned on its axis. Below a photo with retinacula in proper position.

Enlarged about 200x.

Hoya imperialis Lindley 1846

Flower from clone at Sebang, Palawan, Philippines via Ted Green.



Magnified 165x.

Pollinaria

Pollinium

length 1.02 mm
widest 0.30 mm

Retinaculum

length 0.29 mm
shoulder 0.32 mm
waist 0.17 mm
hip

ext. 0.10 mm

Translators

length 0.22 mm
depth 0.04 mm

Caudicle

bulb diam. 0.13mm

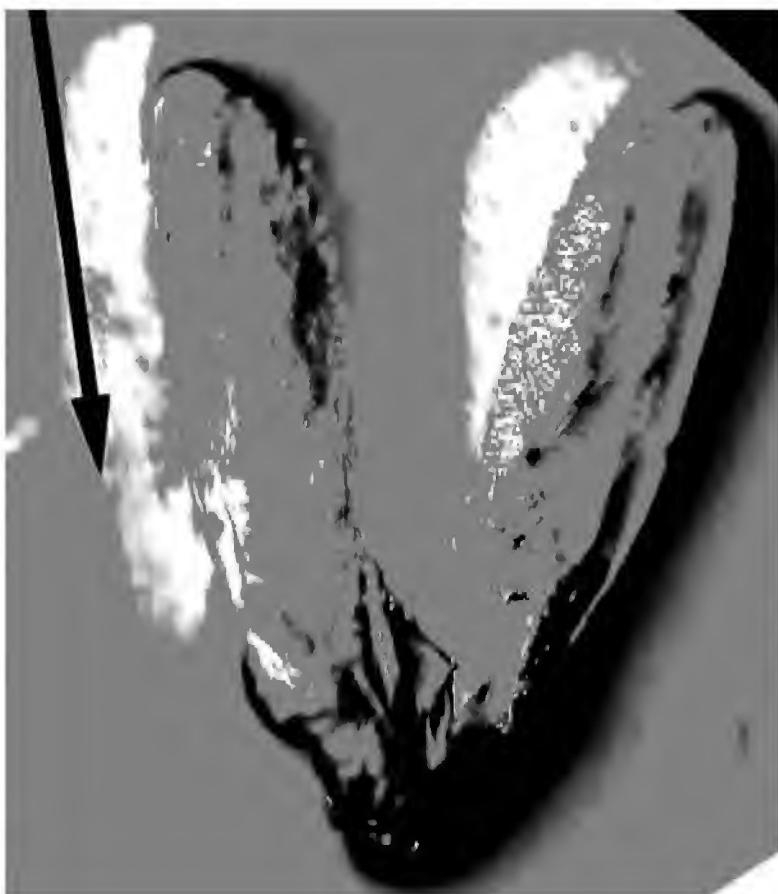
Translator/caudicle
type: ls/o

Pollinia inner end
type: R

Caudicle bulb: clear

Retinacula
character: S

***Hoya pubicorolla* subsp. *glabrapedicila* Kloppenburg & Mendoza
(unpublished) GM #133**



Retinaculum enlarged ca,
0.90x.

Pollinium

length	1.00 mm
widest	0.25 mm

Retinaculum

length	0.35 mm
shoulder	0.20 mm
waist	0.07 mm
hip	0.20 mm
ext	0.05 mm

Translator

length	0.18 mm
widest	0.04 mm

Caudicle

bulb diam.	0.05 mm
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Translator/caudicle type:
ls/o

Pollinia inner end type: T

Retinacula character: HE

***Hoya coriacea* subsp. *philippinensis* Kloppenburg, Siar, & Ferreras
2013**



Pollinium enlarged about 165x.

Pollinium		Pollinia/retinacula type: ls/o
length	1.00 mm	
widest	0.26 mm	Pollinia inner end type: R
Retinaculum		Caudicle: G
length	0.40 mm	
shoulder	0.10 mm	
waist	0.08 mm	Retinacula type: E
hip	0.11 mm	
ext.	0.02 mm	
Translators		
length	0.45 mm	

Caudicle bulb: deltoid

Hoya odorata Schlechter 1906

Flower via TG from Batangas, collected by Prof. J. Pancho.



Magnified
approximately 110x.

Pollinium

length:	0.95 mm
widest:	0.35 mm

Retinaculum

length:	0.40 mm
shoulder:	0.30 mm
waist:	0.13 mm
hip:	0.12 mm
ext.:	0.08 mm

Translators

length:	0.17 mm
depth:	0.04 mm

Caudicle

bulb diam.: 0.10 mm

Translator/caudicle type: ls/o

Pollinia inner end type: R

Caudicle bulb: Clear C

Retinacula character: S

Hoya chunii P. T. Li. 1984

Flower from Ann Wayman, clone PNG #6 Dr. Schlechter's *Hoya reticulata* 1913.



Pollinarium enlarged about 165 times.

Note: Dr. Schlechter mentions that the translators are very small. They appear here to be normal in size to the retinaculum and this type of discrepancy always makes one wonder if we have the correct species. The retinaculum here is well defined. I have not encountered the well defined undifferentiated material from the feet of the retinaculum. The pollinia are somewhat short and stubby with well-defined pellucid edge and vacuole inside from them. Here the caudicles, usually clear, seem to also be differentiated, they are very small.

Pollinarium: pellucid sterile edge wide curving slightly over top on inner apex but not extending to base apex.

Pollinia

length	0.95 mm
widest	0.40 mm

Retinacula

length	0.35 mm
shoulders	0.18 mm
waist	0.14 mm
hips	0.18 mm

Translator

length	0.18 mm
widest	0.09 mm

Caudicle

bulb diam.	0.07 mm
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Translator/caudicle type: ls/o **Pollinia inner end type:** T **Caudicle bulb:** granulate

Retinacula character: S

Hoya stoneana Kloppenburg & Siar 2006

The origin of this species is unknown. It has been in the trade for some time as *Hoya longifolia* pubescent. Under my conditions it is a rapid growing dangling plant and a profuse bloomer. I have named this species in honor of Margie Stone, an avid hoya enthusiast, of Eugene, Oregon, USA.



Pollinarium taken through monocular scope at 100x with digital camera.

Pollinium

length	0.95 mm
widest	0.30 mm

Retinaculum

length	0.40 mm
shoulder	0.19 mm
waist	0.09 mm
hip	0.18 mm
ext.	0.04 mm

Translators

length	0.12 mm
depth	0.05 mm

Caudicle

bulb. diam. 0.08 mm

Translator/caudicle type: ls/o

Pollinia inner end type: RT

Caudicle bulb: granulate

Retinacula character: HE

Ratio: Ret./poll. 2.2

Poll width/length 3.2

Hoya darwinii Loher 1910

Flowered in Hawaii via TG.

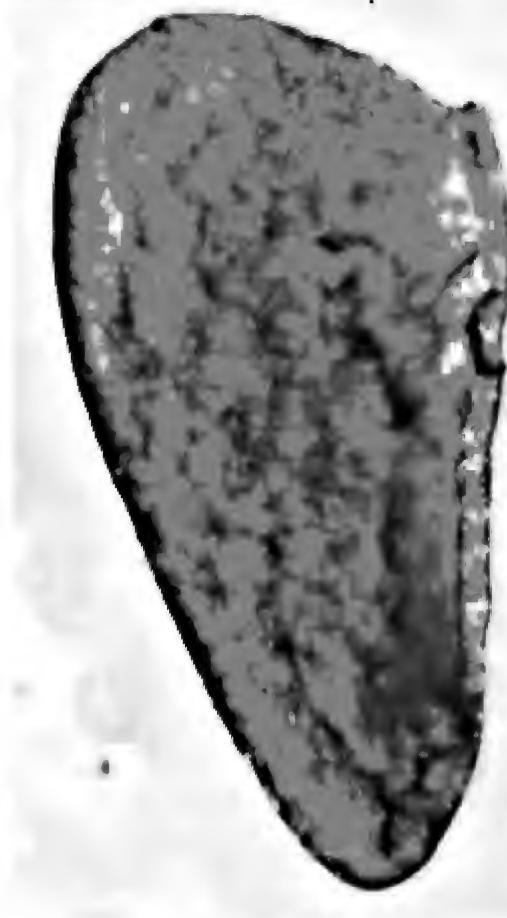


The retinaculum enlarged about 83x. This is a large structure in a large flower.

Retinacula

length	0.57 mm
shoulder	0.50 mm
no definite waist or hips.	
extensions	0.21 mm

Translator/caudicle type: ls/o ?



Pollinia enlarged about 82x. Dr. Rintz felt this species and *Hoya mitrata* Kerr lacked pellucid edges but both of these species do have rudimentary edges. Visible here along the right side. The outer apex is very wide and rounded narrowing to the rounded inner apex.

Pollinia

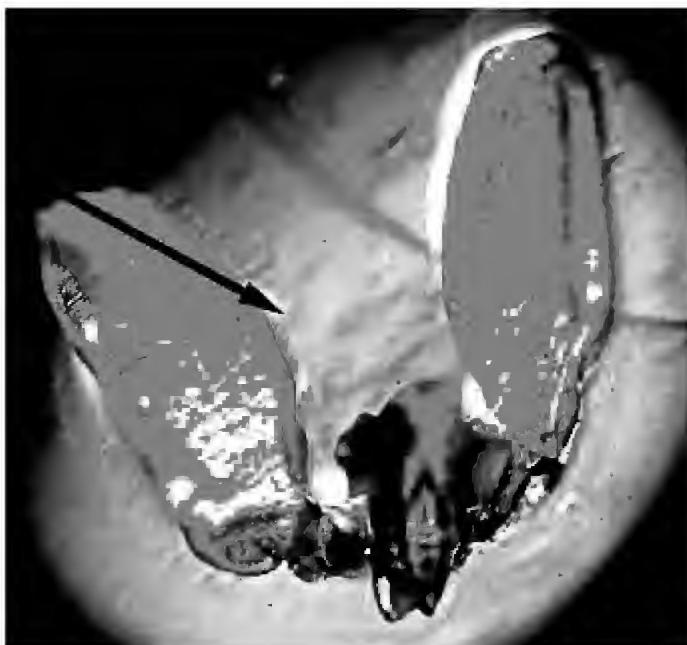
length	0.92 mm
widest	0.42 mm

The pellucid edge does not appear to cover the outer apex but ends abruptly before reaching the apex but extends well down the right outer edge.

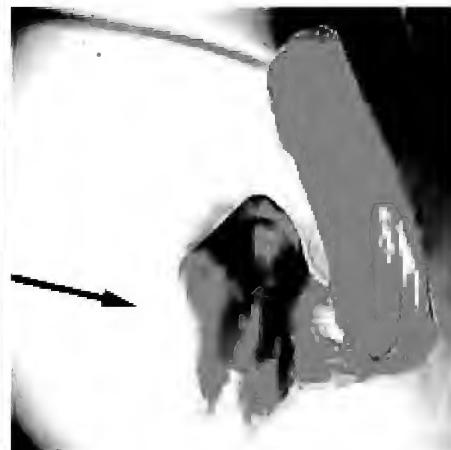
Pollinia inner end type: R

Retinacula character: R

Hoya lazaroii Kloppenburg & Siar 2007



Pollinarium enlarged about 100x.
And to the right a little less.



Pollinium

length	0.92 mm
widest	0.37 mm

Translators

length	0.23 mm
depth	0.04 mm

Retinaculum

length	0.45 mm
shoulders	0.38 mm
waist	0.20 mm
tapers to end	
extensions	0.15 mm

Caudicle

bulb diam.	0.13 mm
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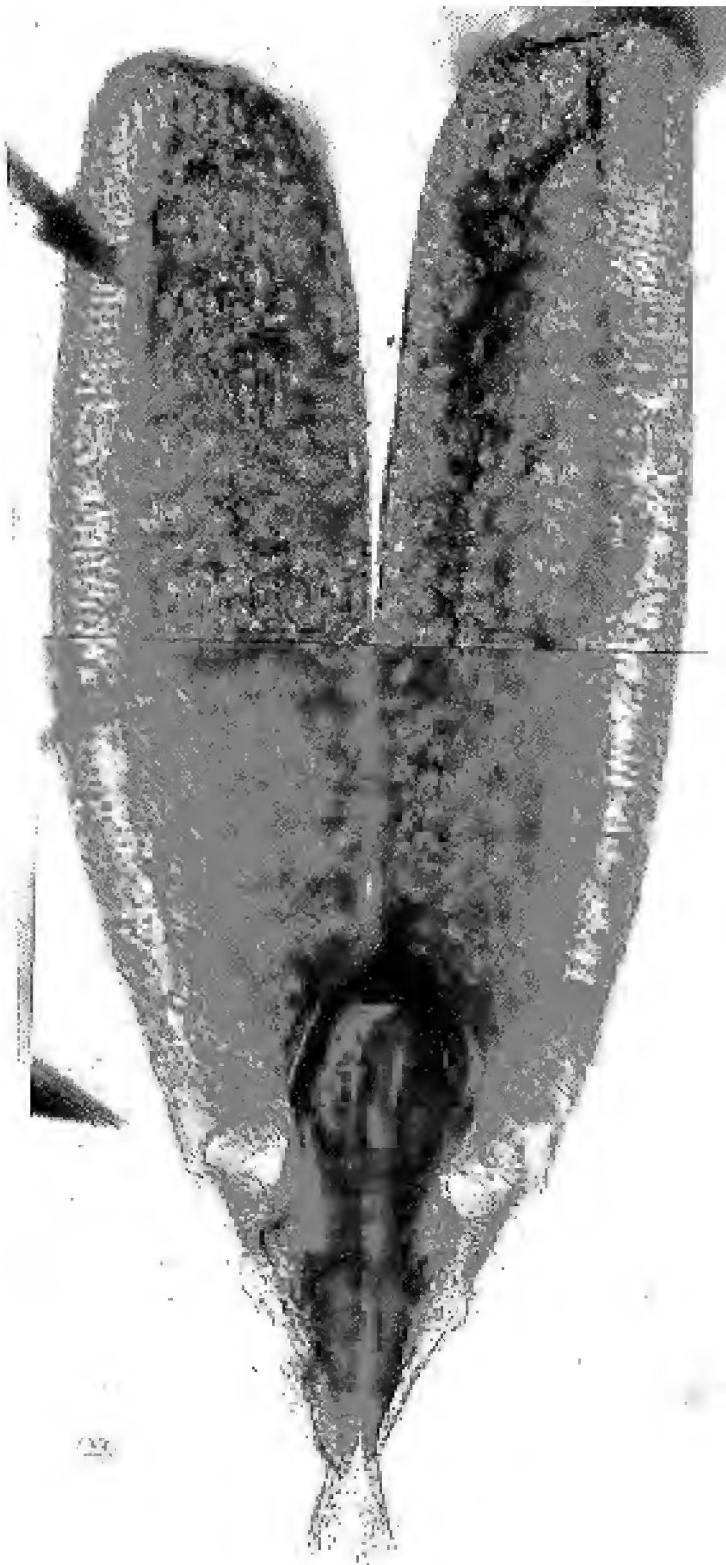
Translator/caudicle type: ls/o

Pollinia inner end type: RT

Caudicle bulb: granulate

Retinacula character: S

***Hoya skinneriana* Kloppenburg & Siar 2011**
as D.D.'s Big One Clone via Jerry Williams, Vista CA., USA.



Pollinarium enlarged about 165x. This is a large pollinarium.

Pollinia

length	0.92 mm
widest	0.26 mm

Retinaculum

length	0.40 mm
shoulder	0.14 mm
waist	0.10 mm
hip	0.15 mm
ext.	0.10 mm

Translator

length	0.07 mm
depth	0.02 mm

Caudicle

bulb	0.09 mm
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Translator/caudicle type: ls/o

Pollinia inner end type: R

Caudicle bulb: granulate

Retinacula character: R

Hoya sp. salweenica

Our plant sold in commerce under this name appears to be a variant or relative of *Hoya carnosa* R. Brown. It does not fit the type material in several critical details, although from the same geographical area. Flowers from Ted Green, Hawaii



Pollinaria enlarged about 165x. This is a large pollinaria.

Pollinia

length	0.90 mm
widest	0.26 mm

Retinaculum

length	0.48 mm
shoulders	0.19 mm
waist	0.08 mm
hips	0.10 mm
extensions	0.08 mm

Translator

length	0.15 mm
depth	0.03 mm
width	0.02 mm

Caudicle

bulb diam. 0.08 mm

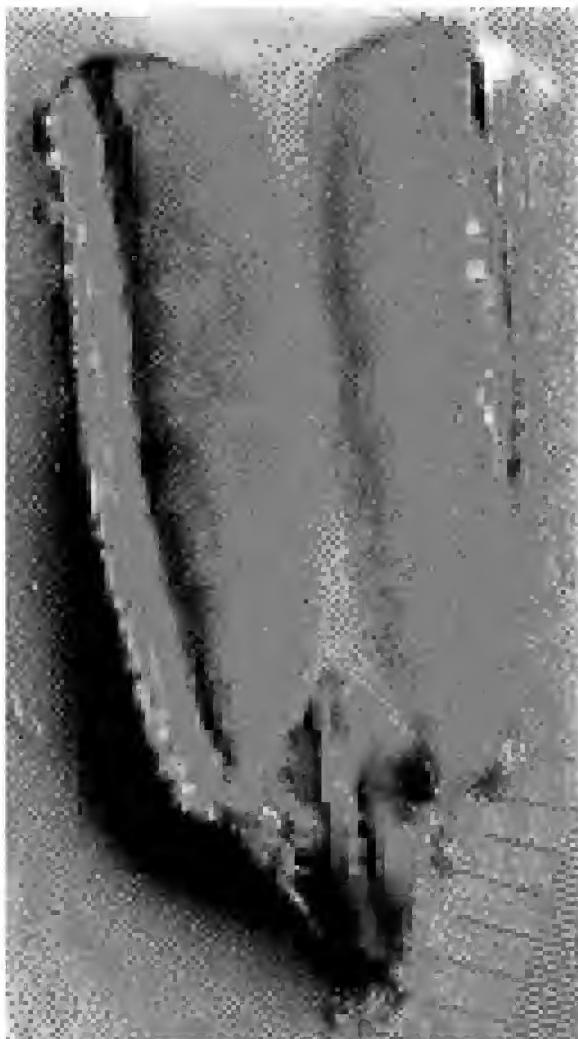
Translator/caudicle type: ls/o

Pollinia inner end type:
R

Caudicle bulb: clear

Retinacula character: R

Hoya meliflua Blanco ex Merrill 1837
Flower via Ann Wayman, Central Point, OR. USA.



Magnified approximately 165x.

Pollinium

length:	0.89 mm
widest:	0.27 mm

Retinaculum

length:	0.34 mm
shoulder:	0.22 mm
waist:	0.06 mm
hip:	0.10 mm
ext.:	0.10 mm

Translators

length:	0.20 mm
depth:	0.03 mm

Caudicle

bulb diam.:	0.05 mm
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Translator/caudicle type: ls/o

Pollinia inner end type: T

Retinacula character: S

Hoya cf. halconensis Kloppenburg 1990

Hoya sp. NS05-225 Flowers given to me in IRI UPLB by Dr. Monina Siar 2006
This is the same sp. as NS05-213



Pollinaria enlarged about 165x. Reticle arrow is 0.10 mm long and head 0.05 mm wide, marks on the stem 0.05 mm long.

Pollinium

length 0.88 mm
widest 0.25 mm

Retinaculum

length 0.30 mm
head 0.14 mm
shoulder 0.15 mm
waist 0.09 mm
hip 0.10 mm
ext. 0.04 mm

Translators

length 0.30 mm
depth 0.02 mm

Caudicle

Cw 0.18 mm top

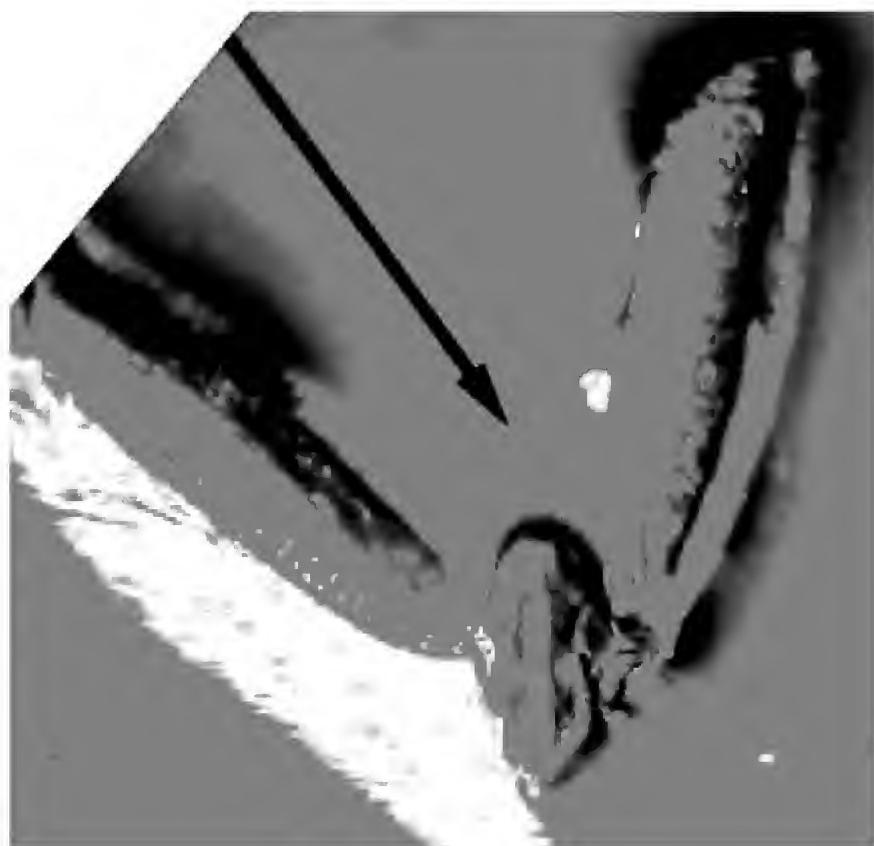
Translator/caudicle type: l/cw

Pollinia inner end type: T

Caudicle bulb: granulate

Retinacula character: R

Hoya celata Kloppenburg, Siar, Mendoza Cajano Guevarra & Carandang 2013



Pollinarium
enlarged about
165x.

Pollinium
length 0.87 mm
widest 0.25 mm

Retinaculum
length 0.33 mm
shoulder 0.20 mm
waist 0.16 mm
hip 0.20 mm
ext. 0.05 mm

Translators
length 0.10 mm
depth 0.04 mm

Caudicle
bulb. dia. 0.06
mm

Translator/caudicle type: ls/o

Pollinia inner end type: RT

Retinacula character: R

Ratio: pol./width 2.6
Pol./ret. 2.3

***Hoya darwinii* subsp. *mabilogensis* Kloppenburg & Mendoza**
(unpublished) GM #106



Pollinaria enlarged ca.
80x.

Pollinium

length	0.87 mm
widest	0.40 mm

Retinaculum

length	0.62 mm
widest	0.54 mm
extensions	0.18 mm

Translators

length	0.40 mm
width	0.03 mm

Caudicle

bulb	0.17 mm
------	---------

Retinacular extensions
somewhat spade shaped



Photo shows the translators and caudicles better.

The pellucid edges are short and narrow, difficult to differentiate. The translators are almost intermingled with the "cw" style caudicles that appear somewhat granulate surfaced.

The retinaculum below is creased all the way down the center.

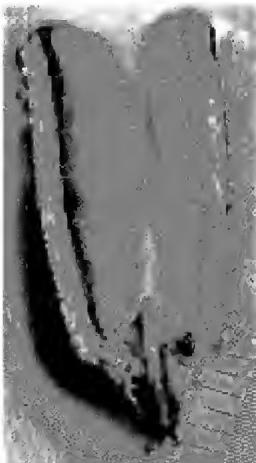
Pollinia apex type: R

Caudicle bulb: G

Retinacula character: R

***Hoya meliflua* subsp. *fraterna* Green 1995**

flower from clone in southern CA.



Pollinarium enlarged about 65 times. This species has a large pollinarium. The pollinia are long, relatively narrow with a well defined retinaculum, short translators and small caudicles.

Pollinium

length:	0.87 mm
widest:	0.27 mm

Retinaculum

length:	0.37 mm
shoulder:	0.19 mm
waist:	0.08 mm
hip:	0.17 mm
ext.:	0.06 mm

Translators

length:	0.13 mm
depth:	0.04 mm

Caudicle

bulb. diam.: 0.08 mm

Translator/caudicle type: ls/o

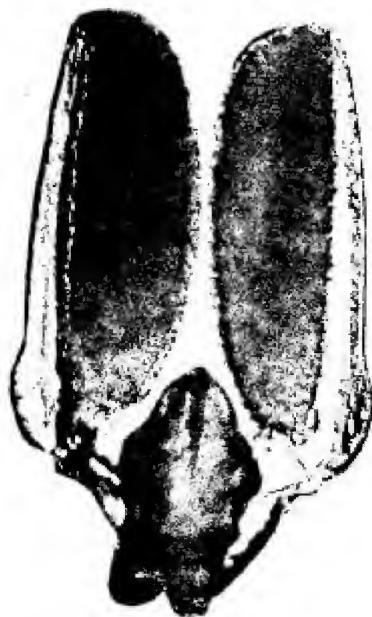
Pollinia inner end type: T

Retinacula character: S

Hoya odorata Schlechter 1906

Clone via TG flowered in Hawaii.

Magnified approximately 65x



Pollinium

length:	0.87 mm
widest:	0.32 mm

Retinaculum

length:	0.45 mm
shoulder:	0.27 mm
waist:	0.19 mm
hip:	0.20 mm
ext.:	0.09 mm

Translators

length:	0.30 mm
depth:	0.03 mm

Caudicle

bulb. diam.:	0.12 mm
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Translator/caudicle type: ls/o

Pollinia inner end type: R

Caudicle bulb: clear

Retinacula character: R

Hoya megalaster Warburg 1901

Flower collected at Ted Green's October 2003. Data and photos 25 November 2003.



Pollinaria enlarged about 165x. Pollinia inner lobes are rounded. The Retinaculum has short horns on the head curved backward and the center here was an open cleft, extensions curved inward near the apex. Translators are short, somewhat tubular and the clear caudicles are small and appear to ride in front and on top of the translator arms (not in the groove on top. They are also relatively small.

Pollinium

length	0.87 mm
widest	0.32 mm

Pollinia inner end type: R

Retinaculum

length	0.35 mm
shoulder	0.30 mm
ext	0.10 mm

Caudicle bulb: clear

Translators

length	0.15 mm
depth	0.01 mm

Translator/caudicle type: ls/o

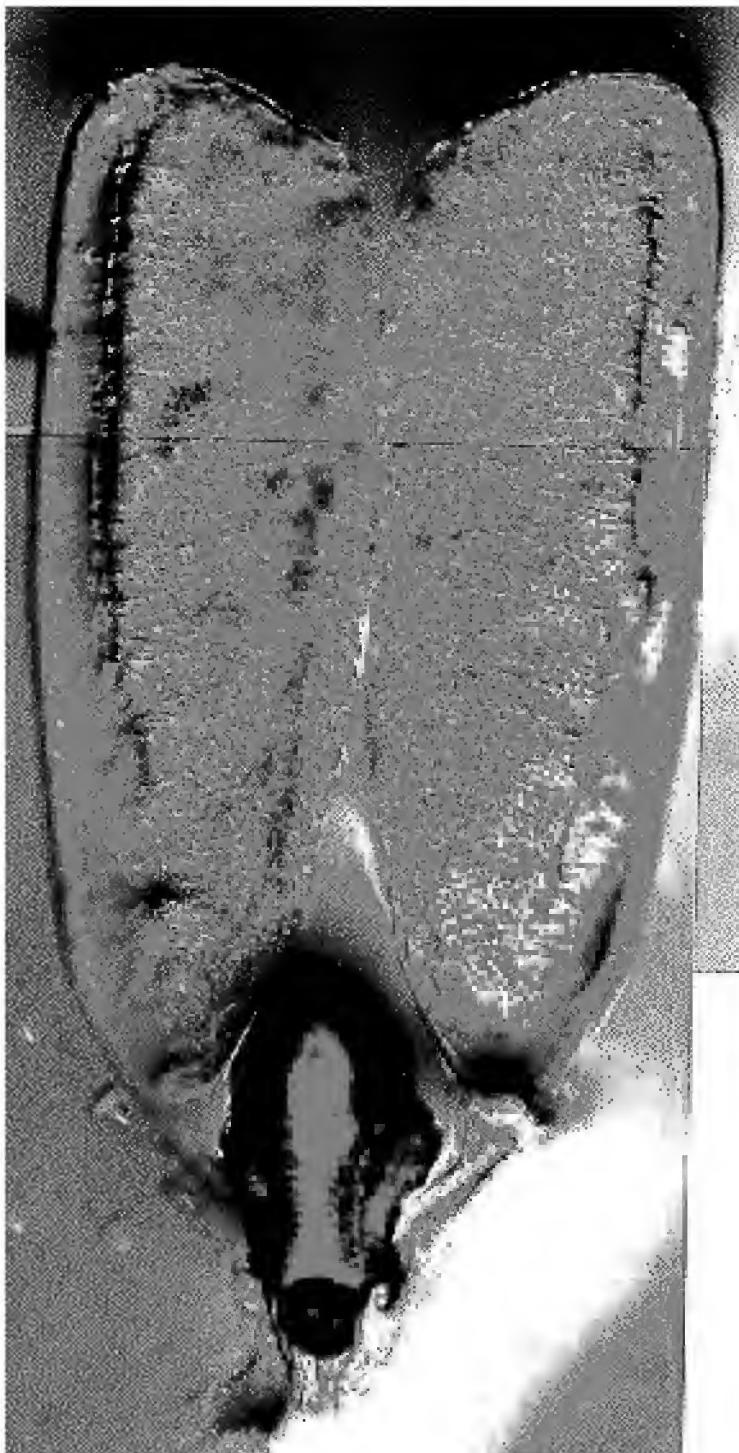
Caudicle

bulb diam	0.15 mm
-----------	---------

Retinacula character: S

***Hoya loyceandrewsiae* Green 1995**

Type clone



Retinacula character: R

View of the pollinarium enlarged about 165x.

Pollinium: large pollinia, free ends taper inward slightly and are rounded, base narrows and is rounded. Pellucid edge almost extends to the caudicle. Retinaculum the rounded head broad shoulders and tapering from there to the apical end. Translators narrowing outward; caudicle well formed into the typical comma shape.

Pollinia

length	0.85 mm
widest	0.27 mm

Retinaculum

length	0.32 mm
long to crotch.	
shoulder.	0.20 mm

Translators

length	0.15 mm
(outside the retinaculum)	

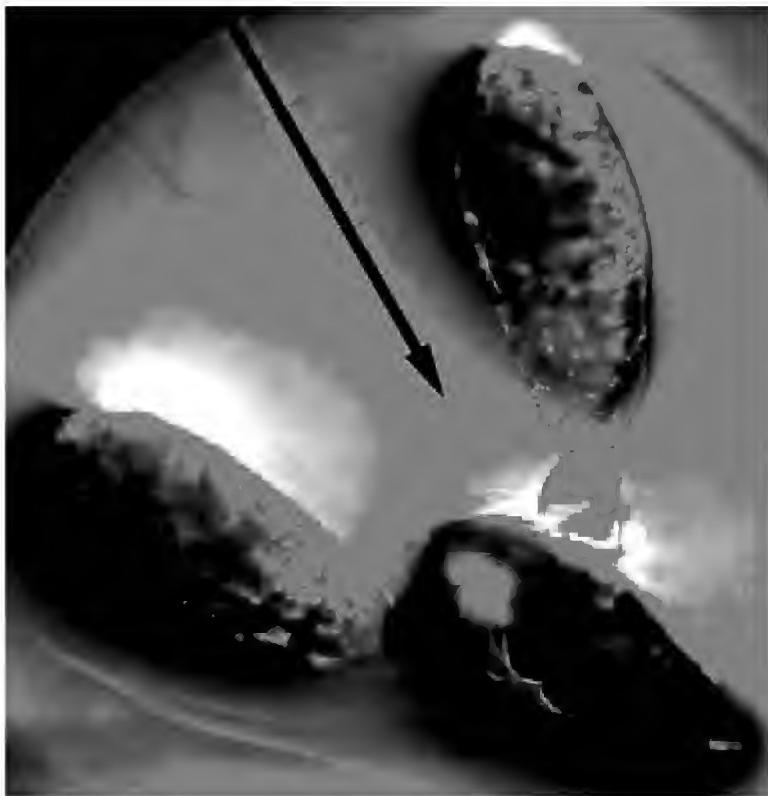
Caudicle

bulbous portion 0.07 mm

Translator/caudicle type:
ls/o

Pollinia inner end type: RT

***Hoya irisae* Ferreras, Kloppenburg & Tandang 2014**



Pollinarium enlarged ca.
70x.

Pollinia

length	0.85 mm
widest	0.35 mm

Retinaculum

length	0.91 mm
widest	0.07 mm

Translator

length	0.21 mm
widest	0.07 mm

Caudicle

bulb diam 0.15 x 0.20 mm

Translator/caudicle type:
ls/o

Pollinia inner end type: R



More photos of the pollinarium structures, I am unable to determine at this time if the retinaculum has turned on its axis. The right side photo would indicate that it has since at the top it appears there may be extensions.

Caudicle bulb: clear

Retinacula character: HE

Hoya desvoeuxensis T. Green & Kloppenburg 2011
Asklepios 112, 2011



Pollinarium enlarged
about 160x.

Pollinium

Retinaculum

length	0.83 mm.
length	0.16 mm.
widest	0.14 mm.
shoulder	0.09 mm.
waist	0.04 mm.

Translator

hip	0.08 mm.
length	0.11 mm.
ext	0.04 mm.

Caudicle bulb diameter
0.07 mm.

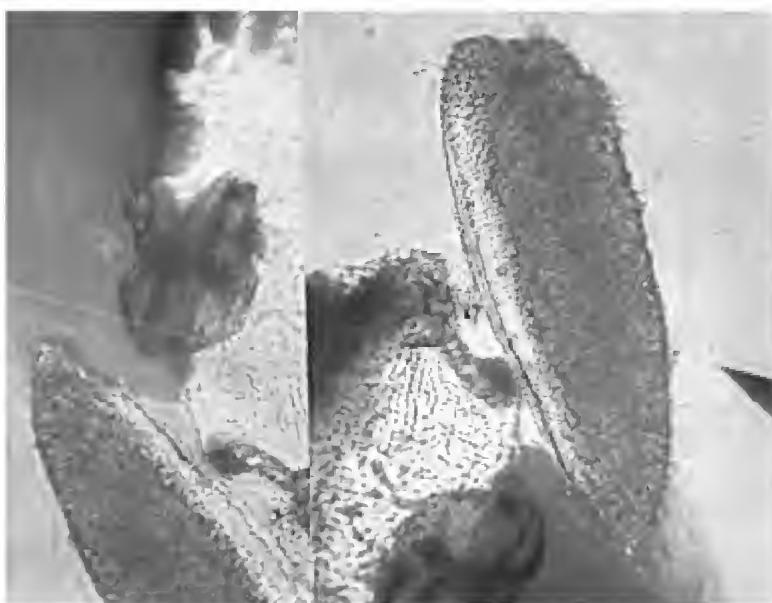
Translator/caudicle:
ls/o

Pollinia inner ends: T
(out)

Retinacula: ?

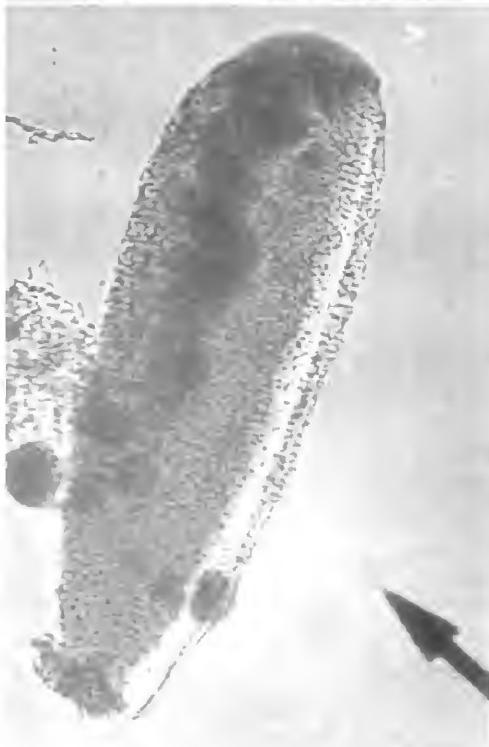
Hoya sp. PNH #9385 1913

Copies at A/2 BO, US, L, BS



Two photos of pollinarium. Pollinia were not attached to the caudicle, some pollinia had germinated (pollen tubes present).

Retinaculum
length 0.24 mm
shoulder 0.14 mm



Pollinium

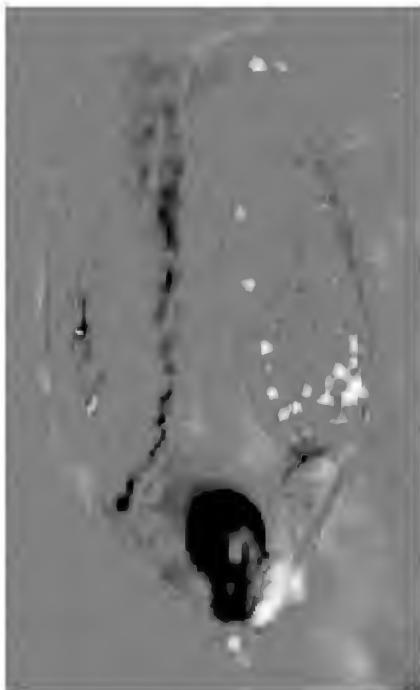
Pollinia
length 0.82 mm
widest 0.26 mm

Translator/caudicle type: ls/o

Pollinia inner end type: R

Hoya buotii Kloppenburg 2002

Type clone



Pollinarium enlarged about 65x. This is a large pollinarium with a small retinaculum, typical of many of Dr. Schlechter's species.

Pollinium

length	0.85 mm
widest	0.30 mm

Retinaculum

length	0.27 mm
shoulder	0.15 mm
waist	0.08 mm
hip	0.10 mm
extensions	0.04 mm

Translators

length	0.35 mm
depth	0.03 mm

Caudicle

bulb diameter 0.13 mm

Translator/caudicle type: ls/o

Pollinia apex type: R

Retinacula character: R

This species has pollinia nearly as long as *Hoya meliflua subspecies fraterna* Green, but the retinaculum is as small as in the species *Hoya lacunosa* Blume.

Hoya pubicorolla Kloppenburg 2013

Flowered in Fresno, CA clone from Dexter Heuschkel, Manila, Philippines.
Previously labeled H. pubicalyx Merrill 1918



Magnified approximately
165x.

Pollinium

length: 0.81 mm
widest: 0.23 mm

Retinaculum

length: 0.27 mm
shoulder: 0.22 mm
waist: 0.09 mm
hip: 0.10 mm
ext.: 0.08 mm

Translators

length: 0.15 mm
depth: 0.02 mm

Caudicle

bulb diam.: 0.11 mm

Translator/caudicle type: ls/o

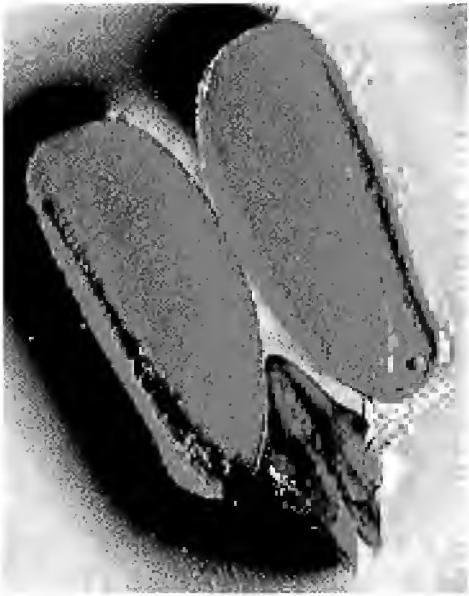
Pollinia end type: T

Caudicle bulb: clear

Retinacula character: S

Hoya australis subsp. australis Trail 1989

IML 6 Silver Valley, Qld. Australia



Pollinarium enlarged about 66x. This is a large pollinarium with the distinctive wide vacuole near the inner apex of the pollinia. The pollinia is entirely different from that found on the *H. rupicola* Hill, found at Talc head, Darwin, Australia.

Pollinium

length	0.81 mm
widest	0.35 mm

Retinaculum

length	0.44 mm
shoulder	0.22 mm
waist ca.	0.11 mm
hip	0.15 mm

Translators

length	0.20 mm
depth	0.07 mm

Caudicle

bulb diam.	0.09 mm
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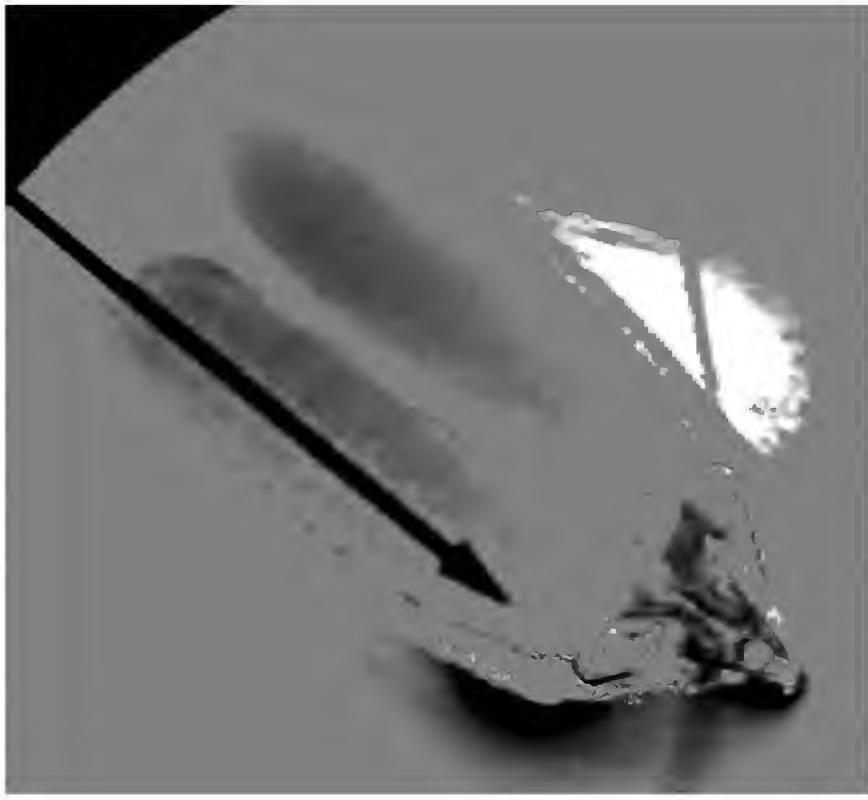
Translator/caudicle type: ls/o

Pollinia end type: R

Caudicle bulb: clear

Retinacula character: HE

***Hoya meliflua* subsp. *mendozae* Kloppenburg**
(unpublished) GM #34



Pollinaria
enlarged ca. 100x.

Pollinium
length 0.80 mm
widest 0.25 mm

Retinaculum
length 0.25 mm
shoulder 0.18 mm
waist 0.08 mm
hip 0.10 mm
ext. 0.05 mm

Translator
length 0.15 mm
depth 0.05 mm

Caudicle
bulb diam. 0.06 mm
x 0.08 mm, oval shaped here.

Translator/caudicle type: ls/o

Pollinia end type: RT

Caudicle bulb: granulate G

Retinacula character: S

Hoya sp. Cl #3

Grown and flowered in Fresno, CA.



Pollinarium enlarged
about 165x. pollinia
are very long and
narrow.

Pollinium

length: 0.80 mm
widest: 0.23 mm

Retinaculum

length: 0.16 mm
shoulder: 0.12 mm
waist: 0.10 mm
hip: 0.14 mm
ext.: 0.04 mm

Translators

length: 0.12 mm
depth: 0.02 mm

Caudicle

bulb. diam.: 0.06 mm

**Translator/caudicle
type:** ls/o

Pollinia end type: R

Retinacula

character: S

***Hoya thompsonii* Hooker f. 1883**

Flower via C.T. from Thailand.

Magnified approximately 165x.



Pollinium

length	0.80 mm
widest	0.25 mm

Retinaculum

length:	0.29 mm
shoulder	0.18 mm
waist	0.07 mm
hip	0.13 mm
extensions	0.03 mm

Translators

length	0.18 mm
depth	0.02 mm

Caudicle

bulb diameter 0.06 mm

Translator/caudicle type:
ls/o

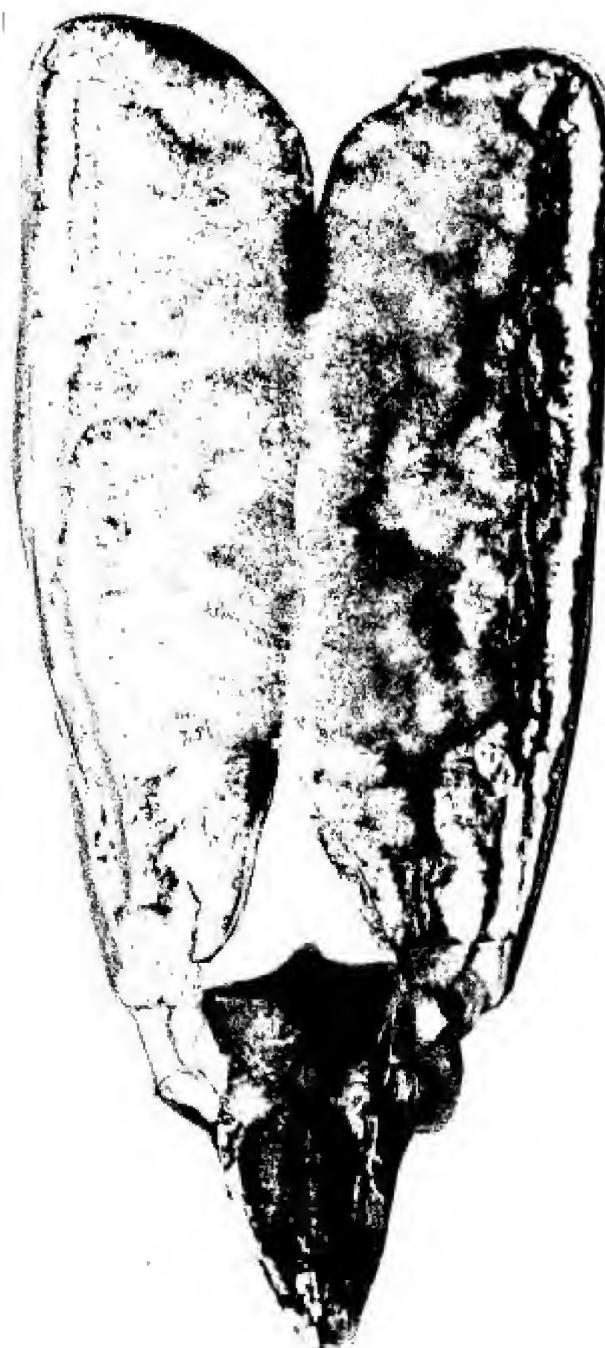
Pollinia end type: F

Caudicle Type: C

Retinacula character: HE

***Hoya motoskei* Teijsmann & Binnend 1852**

Flowered at Fresno, CA., USA.
IML 50 'Thailand White'.



Magnified
approximately 165x.

Pollinium

length: 0.80 mm
widest: 0.25 mm

Retinaculum

length: 0.27 mm
shoulder: 0.18 mm
waist: 0.08 mm
hip: 0.10 mm
ext.: 0.05 mm

Translators

length: 0.12 mm
depth: 0.04 mm

Caudicle

bulb. diam.: 0.08 mm

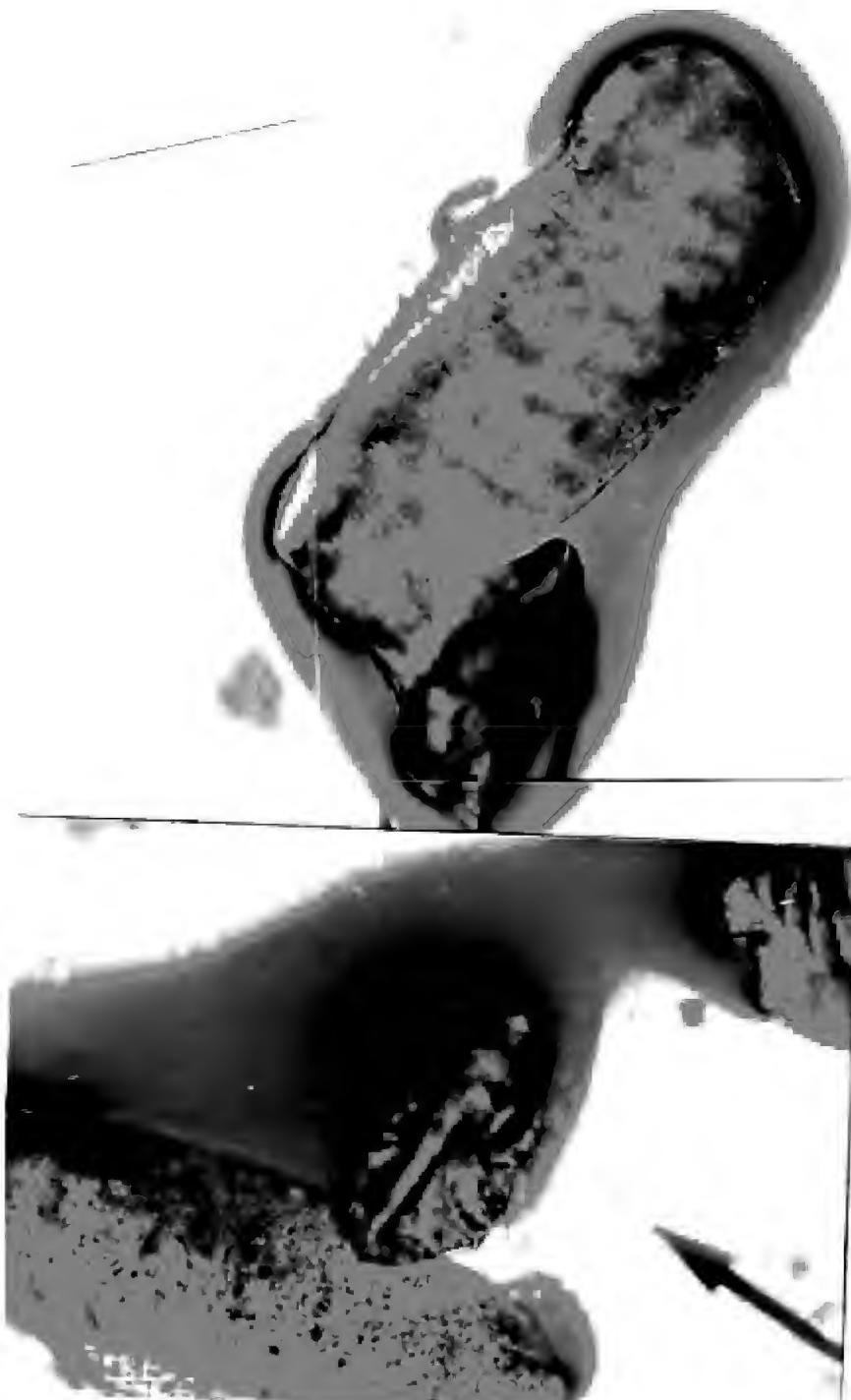
Translator/caudicle type:
ls/o

Pollinia end type: T

Retinacula character: S

Hoya sp. UC 49238

Collected by Ramos/Edano at Mati Davao, Mindanao, Philippines 1927. Roll 54 Draw 70



Composite Photos
of the pollinaria
here and below.

Pollinium

length 0.80 mm
widest 0.32 mm

Retinaculum

length 0.38 mm
should. 0.20 mm

Translator/caudicle type: ls/o

Pollinia end type: RT

Retinacula character: R ?

***Hoya excavata* Teijsmann & Binnendijk 1863**

Pollinarium from flower via Ted Green.



The pollinarium enlarged approximately 165x.

Note: how the retinaculum has somewhat winged shoulders a definite waist area, wider hip area. Here the translators concave top is visible, this supports the usually clear caudicles. In this species the sterile pellucid edge of the pollinia is well developed and seems to extend clear around the end of the pollinia adjacent to the retinaculum. There is a wide vacuole area just inside the sterile edge. Pollen is thick and dense.

Translator/caudicle type: ls/o

Pollinia end type: R

Caudicle bulb: G

Retinacula character: S

Pollinia

length	0.79 mm
widest	0.27 mm

Retinaculum

length	0.27 mm
shoulders	0.18 mm
waist	0.07 mm
hips	0.11 mm

Translator

length	0.11 mm
edge	0.02 mm wide.

Caudicles approx.

0.05 mm in diameter.

Hoya arnottiana Wight 1843

Flower from Ann Wayman



Pollinarium enlarged about 65x. The pollinia are uniformly broad with inner apices rounded, the pellucid edge seems to end above the caudicle attachment area, the vacuole just inside from the sterile edge is well developed. The retinaculum is small and relatively broad. Translators are short Caudicles hardly visible at this magnification.

Pollinarium:

Pollinium

length 0.78 mm
widest 0.30 mm Inner apex rounded, tapering
inward slightly, sterile pellucid edge extends down the outer side
from the inner apical area nearly to the caudicle attachment area.

Retinaculum short and squatly

length 0.19 mm
head 0.14 mm broad
waist area 0.12 mm wide
hips 0.14 mm broad.

Translators very short.

length 0.10 mm

Caudicles about 0.05 mm in diameter at attachment to the pollinium.

Translator/caudicle type: ls/o

Pollinia end type: R

Retinacula character: S

Hoya sp. 297 ex India

Magnified approximately 65x.



Pollinium

length:	0.77 mm
widest:	0.24 mm

Retinaculum

length:	0.27 mm
shoulder:	0.15 mm
waist:	0.06 mm
hip:	0.14 mm
ext.:	0.05 mm

Translators

length:	0.14 mm
depth:	0.03 mm

Caudicle

bulb. diam.: ?

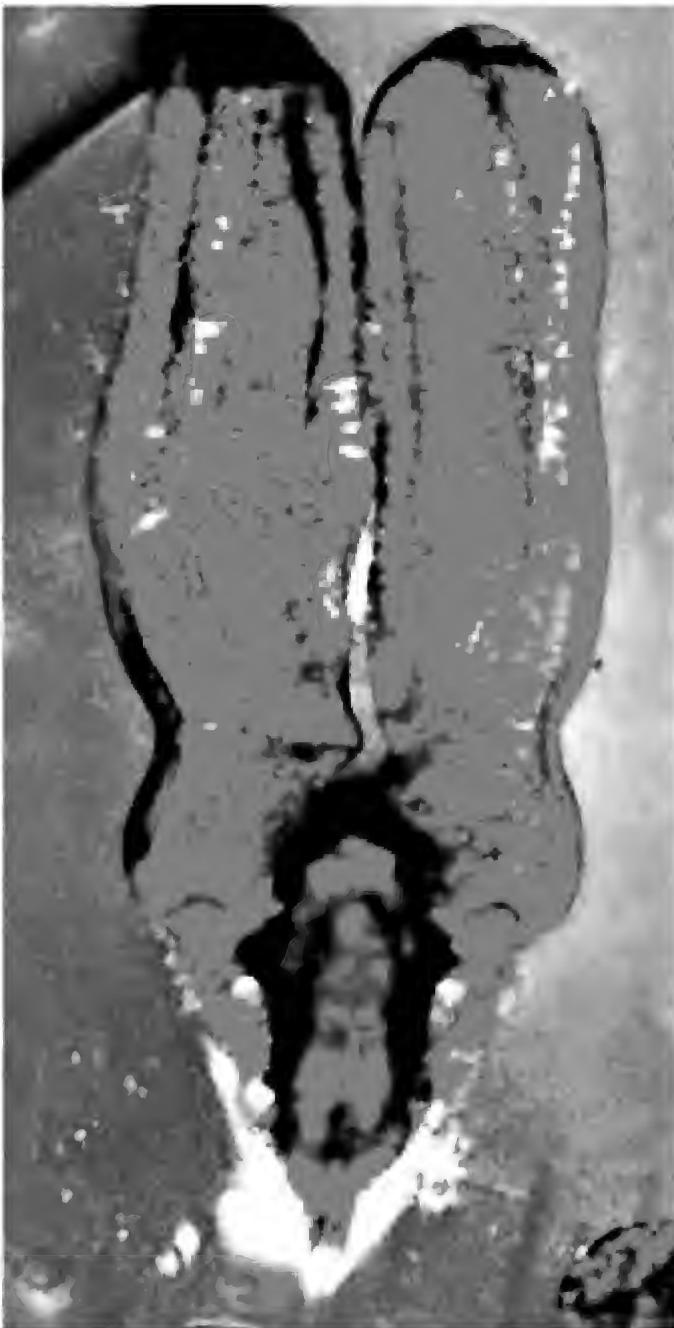
Translator/caudicle type: ls/o

Pollinia end type: T

Retinacula character: S

Hoya sp. BSI #1

via Ann Wayman.



Magnified approximately 165x.

Pollinium

length:	0.77 mm
widest:	0.20 mm

Retinaculum

length:	0.33 mm
shoulder:	0.19 mm
waist:	0.11 mm
hip:	0.16 mm
ext.:	0.06 mm

Translators

length:	0.16 mm
depth:	0.02 mm

Caudicle

bulb. diam.: 0.05 mm

Translator/caudicle type: ls/o

Pollinia end type: R

Caudicle bulb: C

Retinacula character: R

***Hoya meliflua* subsp. *escobinae* Kloppenburg 2016**



Pollinarium

length	0.77 mm
widest	0.39 mm

Retinaculum

length	0.32 mm
shoulder	0.37 mm
waist	0.14 mm
hip	0.16 mm
ext.	0.04 mm

Translator

length	0.10 mm
widest	0.04 mm

Caudicle

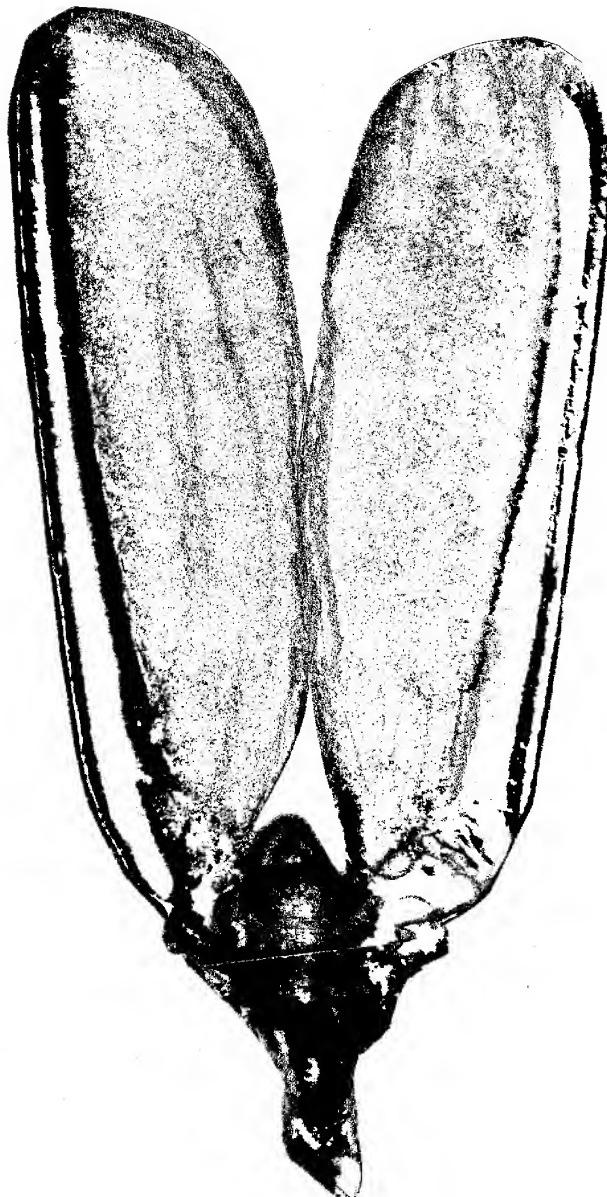
bulb diam.	0.06 mm
------------	---------

Translator/caudicle type: ls/o

Retinacula type: S (shield)

Pollinia inner ends: R (round)

Hoya sp. Thailand
via C.T., Bangkok, Thailand.



Magnified approximately 165x.

Pollinium

length:	0.76 mm
widest:	0.23 mm

Retinaculum

length:	0.20 mm
shoulder:	0.15 mm
waist:	0.15 mm
hip:	0.08 mm
ext.:	0.07 mm

Translators

length:	0.09 mm
depth:	0.02 mm

Caudicle

bulb. diam.:	0.06 mm
--------------	---------

Translator/caudicle type: ls/o

Pollinia end type: RT

Caudicle bulb: C

Retinacula character: S

(NOT) ***Hoya apiculata*** Scheff. 1896

Flower via Ted Green.



Magnified
approximately 165x.

Pollinium

length 0.75 mm
widest 0.32 mm

Retinaculum

length 0.23 mm
shoulder 0.19 mm
waist 0.08 mm
hip 0.10 mm
ext. 0.10 mm

Translators

Length 0.18 mm
Depth 0.03 mm

Caudicle

appears to be linear

Translator/caudicle type:

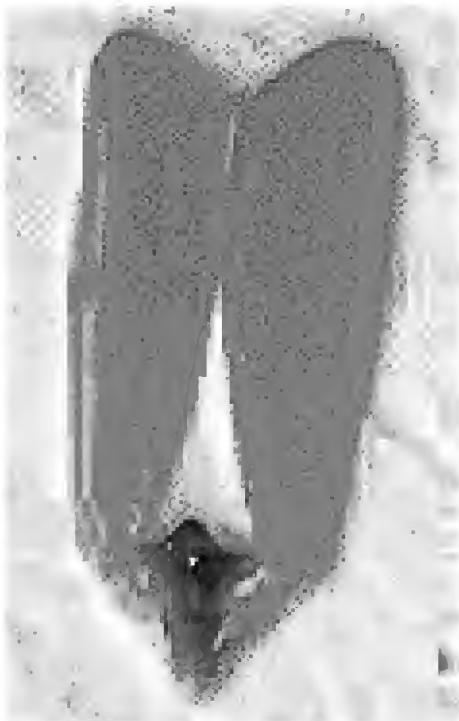
ls/o

Pollinia end type: R

Caudicle bulb: C

Retinacula character: S

Hoya carnosa R. Brown 1802
Pale (white) flower Fresno, CA. 1995.



Pollinarium enlarged about 85x. The pollinia here are long and relatively narrow with pellucid edges from the outer apical area to near the caudicle attachments, accompanied inside by nearly uniform vacuoles. The retinaculum has a large winged head a narrow waist. small hip area which tapers to the extensions. Translators are almost "J" shaped with small caudicles.

Pollinarium

Pollinia

length	0.75 mm
widest	0.22 mm

Retinaculum

length	0.28 mm
shoulder	0.16 mm
waist	0.10 mm
hip	0.12 mm
extensions	0.03 mm

Translators

length	0.10 mm
depth	0.04 mm

Caudicle

bulb diam.	0.07 mm
------------	---------

Translator/caudicle type: ls/o

Pollinia end type: RT

Caudicle bulb: C

Retinacula character: S

Hoya odorata subsp. antoinensis Kloppenburg 2015

PNH 19549

Collected by B. B. Briton, Talinas, Antoin of Negros, Oriental, Philippines. 5 Sept. 1953.

North slope forest. elevation 1300 meters. Tiny whitish flower.

Originally labeled as *Centrostemma multiflora* (Bl.) Decaisne



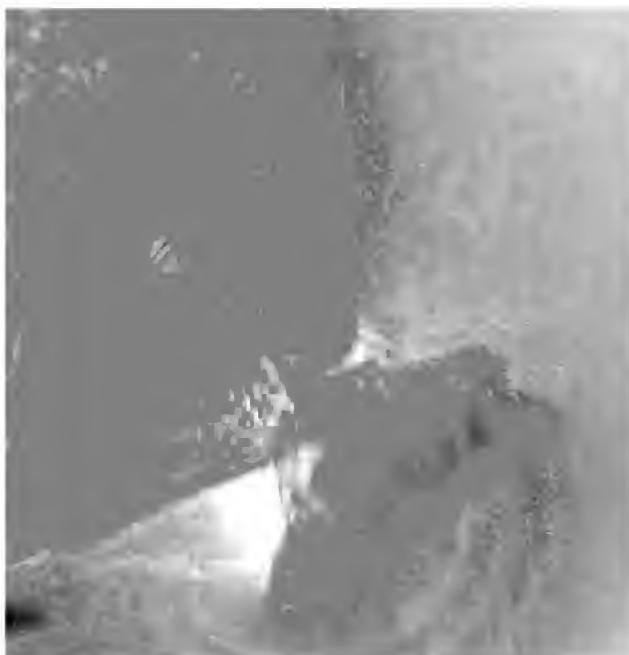
Pollinaria. Both pollinia have germinated, retinaculum has twisted laying on side.

Pollinia

length	0.75 mm ca.
widest	0.18 mm

Retinaculum

length	0.25 mm
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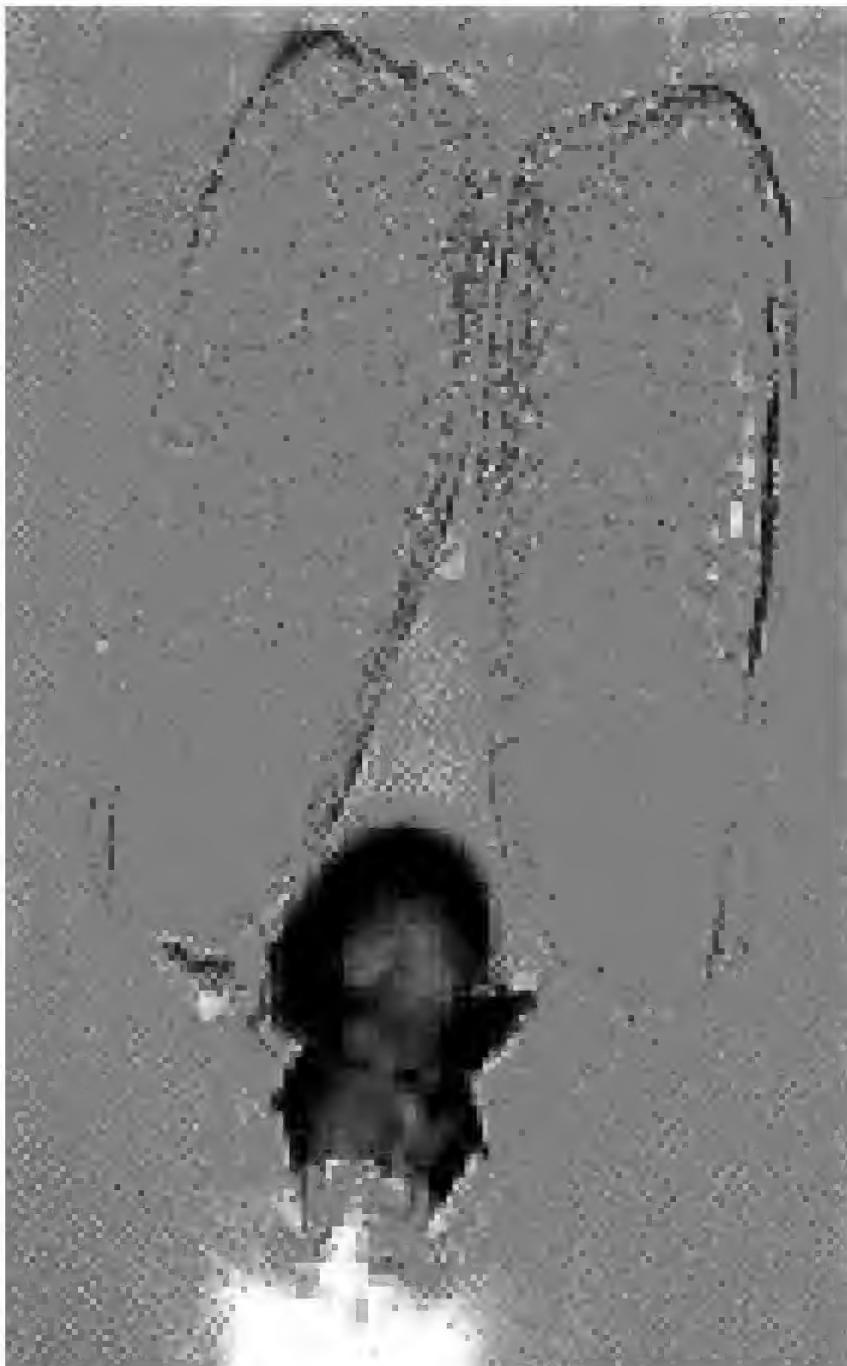
Another photo of the pollinaria. Best I could do with this sheet.

As far as I can determine this is similar to other *H. cumingiana* pollinaria.

The inner coronal lobes overlapping are not typical of this species, nor are the obtuse outer lobes. The flower here is a little smaller also.

Hoya paziae Kloppenburg 1990

Pollinium form flower via TG
clone 831515.



Magnified
approximately 165x.

Pollinium

length: 0.75 mm
widest: 0.25 mm

Retinaculum

length: 0.30 mm
shoulder: 0.22 mm
waist: 0.14 mm
hip: 0.20 mm
ext.: 0.10 mm

Translators

length: 0.17 mm
depth: 0.05 mm

Caudicle

bulb. diam.: 0.08 mm

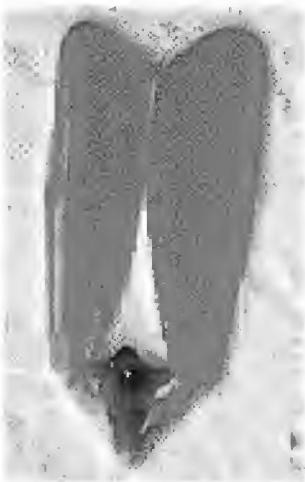
**Translator/caudicle
type:** ls/o

Pollinia end type: R

Caudicle Bulb: C

**Retinacula
character:** R

Hoya carnosa R. Brown 1802
Seedling clone D124 flowered in Fresno, CA. USA.



Pollinarium

Pollinia

length	0.75 mm
widest	0.22 mm

Retinaculum

length	0.28 mm
shoulder	0.16 mm
waist	0.10 mm
hip	0.12 mm
extensions	0.03 mm

Translators

length	0.10 mm
depth	0.04 mm

Caudicles

bulb diam.	0.07 mm
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Translator/caudicle type: ls/o

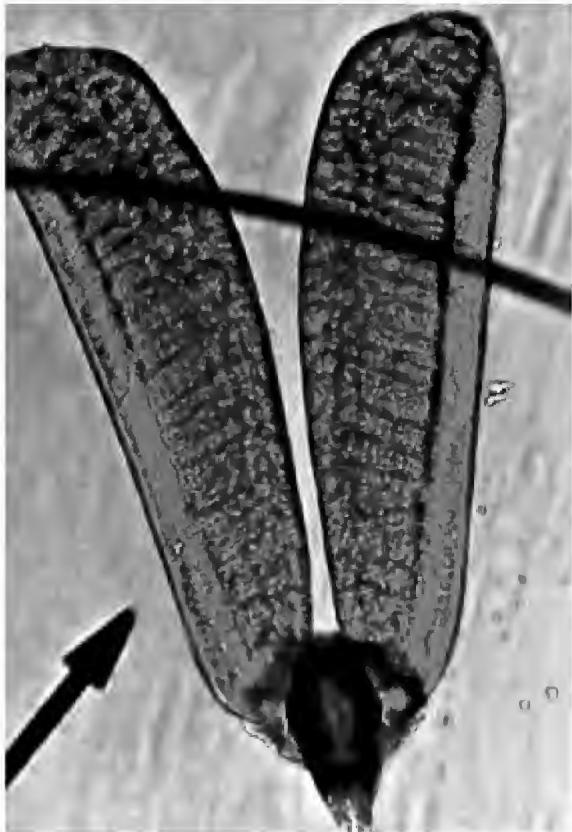
Pollinia end type: RT

Caudicle Bulb: C

Retinacula character: S

Hoya cumingiana Decaisne 1844

Flower from clone (**Hoya densifolia**) Mt. Mayon, Legaspi, Philippines 1995.



Pollinaria enlarged about 165x.

The curved dark line is from the glass circle on the microscope slide. The arrow on lower left is 0.1 mm long.

Pollinia

length	0.75 mm
widest	0.30 mm

Retinaculum

length	0.15 mm
shoulder	0.10 mm
waist	0.09 mm
hips	0.09 mm
extensions	0.06 mm

Translator

length	0.09 mm
depth	0.02 mm

Caudicle

bulb diam.	0.05 mm
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Translator/caudicle type: ls/o

Pollinia end type: RT

Caudicle Bulb: ?

Retinacula character: R

Discussion: This species was reported by Turczaninow as coming from the island of Java, however as far as I can determine no specimens in commerce came from there. If we have the same species in our present collections they are all from the Philippines. Our material seems to fit the drawing in *Icones Bogorensis* (Tab. 242) except that the leaf apices on our specimens seem to be more apiculate and not as rounded.

Hoya corollamarginata Kloppenburg 2017
W 5165 Hoya betchei (Schltr.) Whistler, Matavanu Crater, Savai'i



Pollinaria enlarged about 165x. The retinaculum is skewed up over the ends of the pollinia so the translators are not visible in their entirety.

Pollinia

length	0.75 mm
widest	0.22 mm

Retinaculum

length	0.30 mm
shoulder	0.19 mm
waist	0.08 mm
hip	0.15 mm

Caudicle bulb

diameter	0.06 mm
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Translator/caudicle type: ls/o

Pollinia end type: T

Caudicle Bulb: ?

Retinacula character: S ?

***Hoya fetuana* subsp. *sigeleensis* Kloppenburg 2017**

W 344 chlorantha-betchei



Pollinarium enlarged about 165x.
The retinaculum is turned on the axis of
the translators and caudicle so the head
here is pointed down.

Pollinia

length 0.74 mm
widest 0.23 mm

Retinaculum

length 0.37 mm
shoulder 0.26 mm
waist 0.10 mm
hip 0.14 mm
ext. 0.04 mm

Translator

length 0.18 mm
depth 0.03 mm

Caudicle bulb

diameter 0.10 mm

Translator/caudicle type: ls/o

Pollinia end type: R

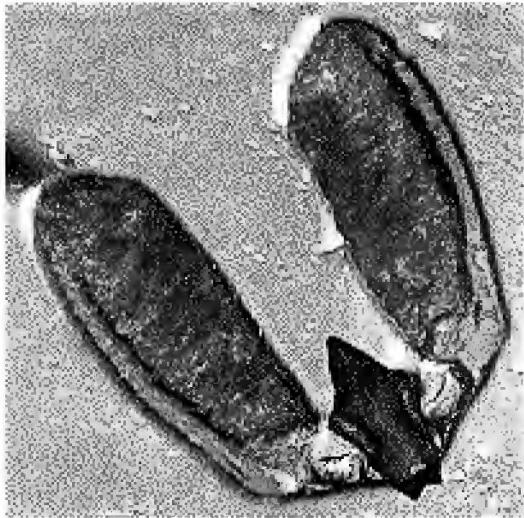
Caudicle Bulb: ?

Retinacula character: HU



A better view of the retinaculum and the translator arms. This is a large retinaculum.

Hoya rupicola Hill 1988



Pollinarium enlarged about 66X. from a plant sent to me by Peter Tsang, collected at Talc head, Darwin, Australia. Bloomed, Fresno, CA. 10/89.

Pollinium

length	0.74 mm
widest	0.28 mm

Retinaculum

length	0.33 mm
shoulder	0.21 mm
waist	0.12 mm
hip	0.15 mm
extensions	0.03 mm

Translators

length	0.14 mm
depth	0.06 mm

Caudicle

bulb diam. 0.10 mm

Translator/caudicle type: ls/o

Pollinia inner end type: T

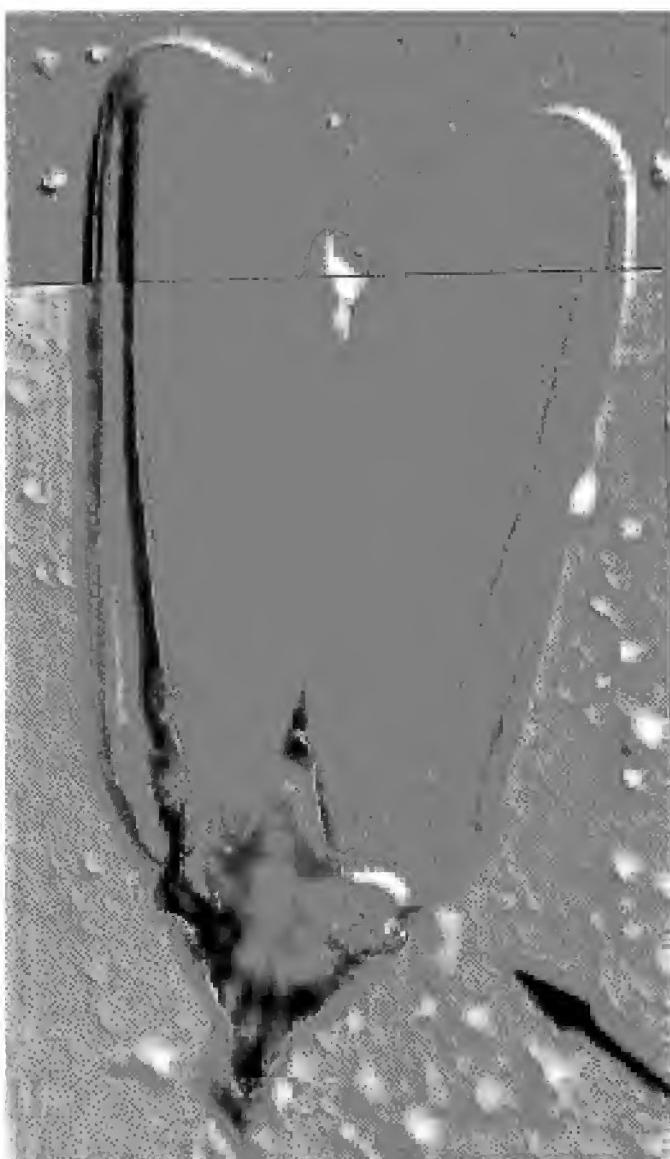
Caudicle bulb: C

Retinacula character: HE

Paul I. Forster and David J. Liddle in Austrobalia 3:3 1991 "Variation in *Hoya australis* R. Br, ex Trail recognized "5 subspecies within the *H. australis* complex, defined by vegetative characteristics and flora phenology. *H. australis* subsp. *oramicola* is newly described and the new combination *H. australis* subsp. *tenuipes* (*H. oligotricha* subsp. *tenuipes* K. hill) and *H. australis* subsp *rupicola* (*H. rupicola* K. Hill) are made."

If all these species represent a cline (with continuous variation) then the lumping of all these species as subspecies under *H. australis* R. Brown ex Trail is proper. The foliage of these varies widely. Flowers vary in size and color. Coronal lobe width presented of 9 individuals? shows a range from 4mm. to 6mm for *H. rupicola*; pollinia length and width of 14 measurements: length form 0.50 mm to 0.95 mm and width from 0.17 mm to 0.31 mm There is no statistical analysis of the data presented but it does cover a lot of material.

Hoya subquintuplinervis Miquel 1869
Flower from a clone purchased as Hoya sp. Cheng Mai.



The Pollinaria here is very large and the picture is a composite of two photomicrographs. Enlarged Approx. 165x. The translator here are very short as are the caudicles. The pellucid edge twists as it approaches the caudicle and is visible on the left pollinium touching the translator arm.

Pollinium

length	0.74 mm
widest	0.22 mm

Retinaculum

length	0.20 mm
shoulder	0.17 mm
waist	0.12 mm
hip	0.14 mm
extensions	0.08 mm

Translators

length	0.12 mm
depth	0.04 mm

Caudicle

bulb diam.	0.05 mm
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Pollinia: Rounded-ovate finely granular, sterile edge twist to dumbbell-rod shaped, Caudicles present but difficult to ascertain.

Translator/caudicle type: ls/o

Pollinia inner end type: R

Caudicle bulb: G

Retinacula character: S

***Hoya fungii* Merrill 1934**

Pollinarium from flowering at Fresno, CA., USA.



Here the pollinarium is enlarged about 165x. See how the vacuole narrows toward the attachment area. The caudicle is difficult to distinguish from the translators here, shaped like a pollywog. The head of the retinaculum is broadly rounded with well defined hip area and a central groove.

Pollinia

length	0.74 mm
widest	0.19 mm

Retinaculum

length	0.25 mm
shoulder	0.16 mm
waist	0.07 mm
hip	0.11 mm
extensions	0.08 mm

Translators

length	0.12 mm
depth	0.04 mm

Caudicle

bulb diam.	0.06 mm
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Translator/caudicle type: ls/o

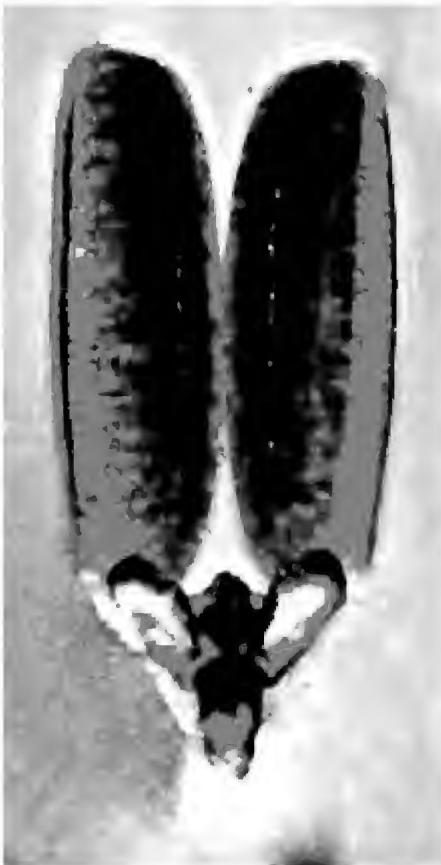
Pollinia inner end type: R

Caudicle bulb: C

Retinacula character: R

***Hoya greenii* Kloppenburg 1995**

Type clone collected by Ted Green on Mt. Apo, Mindanao, Philippines
Flowered at Kaaawa, Hawaii USA via TG.



Pollinaria enlarged about 90x. This is a relatively large structure and has an unusual head to the retinaculum, which I have not observed in other hoya species. It has two incurved horn like structures on the top. In this photo they show up as dark linear parts but actually are curved in above like a cows horns and also have acute apices.

Pollinium

length	0.74 mm
widest	0.25 mm

Retinacula

shoulder	0.15 mm
waist	0.10 mm
hip	0.11 mm
ext.	0.05 mm

Translator

length	0.16 mm
depth	0.03 mm

Caudicle
bulb diam 0.06 mm

Translator/caudicle type: ls/o

Pollinia inner end type: R

Caudicle bulb: C

Retinacula character: S

***Hoya australis* subsp. *oramicola* Forster & Liddle 1991**

Grown and flowered in Fresno, CA. from clone via PT.



Magnified approximately 165x.

Pollinium

length:	0.73 mm
widest:	0.27 mm

Retinaculum

length:	0.27 mm
shoulder:	0.18 mm
waist:	0.15 mm
hip:	0.10 mm
ext.:	0.13 mm

Translators

length:	0.12 mm
depth:	0.03 mm

Caudicle

bulb. diam.: 0.09 mm

Translator/caudicle type: ls/o

Pollinia inner end type: T

Caudicle bulb: G

Retinacula character: R

Hoya hernaezii Kloppenburg
(unpublished) DH #54



Pollinia enlarged 130x.

Pollinium

length	0.73 mm
widest	0.24 mm

Retinaculum

length	0.29 mm
shoulder	0.16 mm
waist	0.09 mm
hip	0.15 mm
ext.	0.06 mm

Translator

length	0.15 mm
widest	0.05 mm

Caudicle

bulb diam. 0.06 mm

Retinacula character: S

Translator/caudicle type: ls/o

Pollinia inner end type: T

Hoya patameaensis Kloppenburg 2017

Retinaculum enlarged about 165x. One translator attached to the left.

length	0.27 mm
shoulders	0.18 mm
waist	0.08 mm
hips	0.14 mm
extensions	0.05 mm

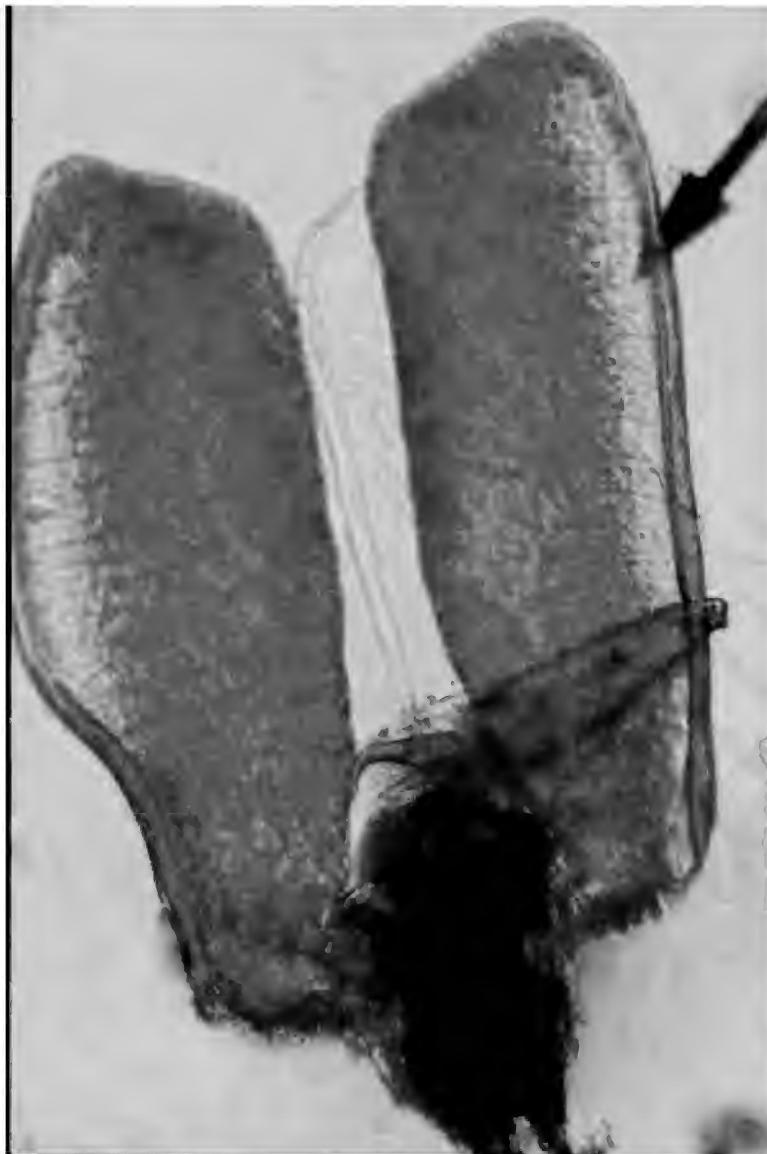
Translator

length	0.15 mm
depth	0.03 mm

Caudicle

bulb diam.

0.03 mm it is somewhat flattened.



Pollinarium enlarged about 165x. A foreign object lays to the left above the dark retinaculum.

length 0.73 mm
widest 0.24 mm

Translator/caudicle type: p/o

Caudicle bulb: G

Pollinia inner ends: T

Retinaculum: S

***Hoya betchei* (Schlechter) Whistler 1978**



Pollinarium enlarged about 155x. The pollinia are long and narrow, translator arms short triangular. The arms and caudicle seem to enter the retinaculum near its waist.

Pollinia

length	0.72 mm
widest	0.24 mm

Retinacula

length	0.26 mm
Shoulder	0.12 mm
waist	0.08 mm
hip	0.10 mm

Caudicle bulb diam. 0.07 mm

Translators

length	0.14 mm
widest	0.05 mm

***Hoya australis* subsp. *nathalieae* Kloppenburg & Siar 2011**

Hoya sp. 2046 via Monina from Nathalie, New Guinea 2005

2 leaves and 1 flowers, more flowers later **Type** clone



Pollinium enlarged
about 165x.

Pollinium

length 0.72 mm
widest 0.28 mm

Retinaculum

length 0.40 mm
shoulder 0.23 mm
waist 0.11 mm
hip 0.16 mm
ext. 0.13 mm

Translator

length 0.22 mm
widest 0.05 mm
depth 0.02 mm

Caudicle

bulb diam. 0.08 mm

Translator/caudicle type: ls/o

Pollinia inner end type: RT

Caudicle bulb: C

Retinacula character: HE

Hoya odorata Schlechter, UC 14519

Collected by A. Loher at Rizal, Luzon, Philippines May 1916.



Pollinium with
retinaculum twister on the
axis.

Pollinium

length	0.72 mm
widest	0.30 mm

Retinaculum

length	0.33 mm
shoulder	0.25 mm
waist	0.23 mm
hip	0.34 mm
ext.	0.06 mm



Translators

length	0.14 mm
depth	0.05 mm

Caudicle bulb 0.10 mm

Same pollinarium with retinaculum twisted on the axis of the translators. More detail of the [pollinium structure. The wide spare at the base (lower side vacuole) is typical of the Hoya australis group.

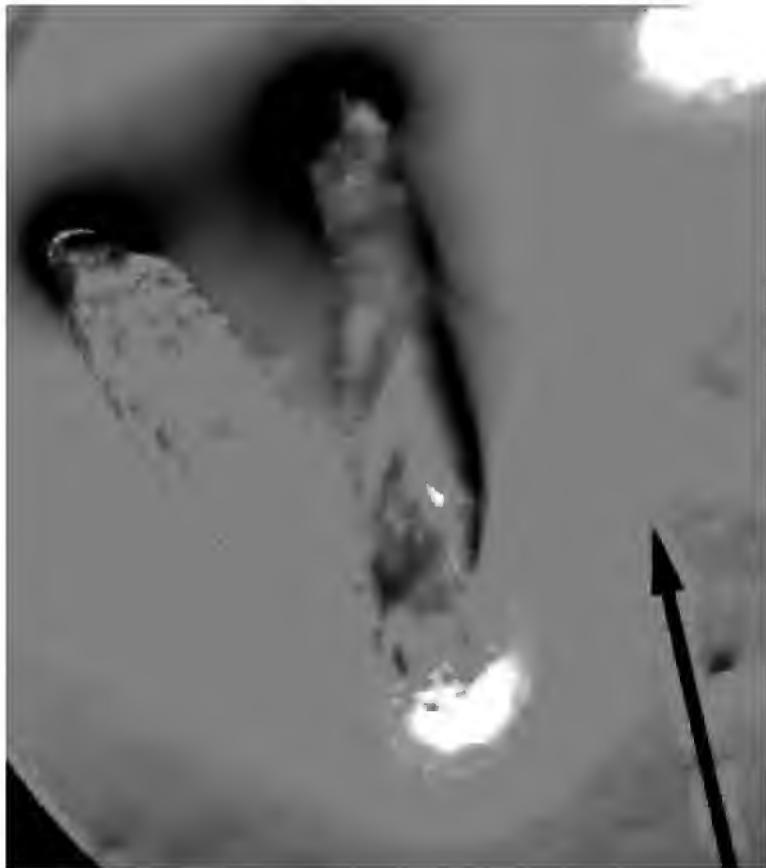
Translator/caudicle type: ls/o

Pollinia inner end type: RT

Caudicle bulb: C

Retinacula character: R

***Hoya pubicenta* Kloppenburg, Mendoza & Ferreras 2014**



Pollinaria above enlarged
ca. 95x; below ca. 90x.

Pollinarium

length 0.72 mm
widest 0.20 mm

Retinaculum

length 0.22 mm
shoulder 0.20 mm
waist 0.10 mm
hip 0.15 mm
ext. 0.05 mm

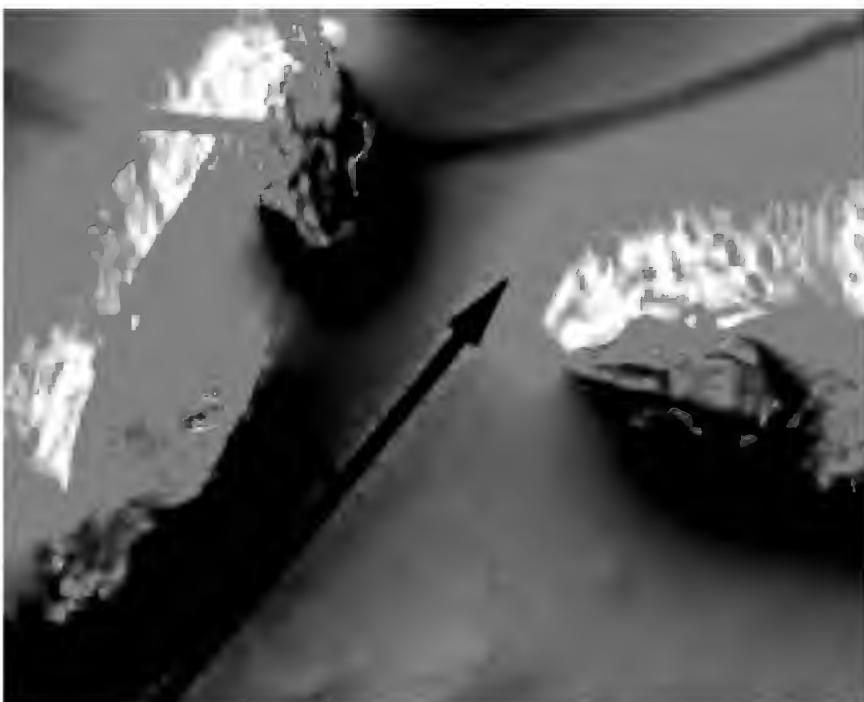
Translator

length 0.10 mm
depth 0.02 mm

Caudicle

bulb d. 0.10 mm

Translator/ Caudicle type: ls/o Pollinia inner end type: T Caudicle bulb: ?



Retinacula
character: HE ?

***Hoya pubicorolla* Kloppenburg, Mendoza & Ferreras 2013**



Pollinarium enlarged
about 165x. Measurements for
this clone

Pollinia

length	0.72 mm
widest	0.23 mm

Retinaculum

length	0.27 mm
shoulder	0.22 mm
waist	0.09 mm
hips	0.10 mm
extensions	0.08 mm

Translators

length	0.15 mm
depth	0.02 mm

Caudicle

bulb diam.	0.11 mm
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Translator/caudicle type: ls/o

Pollinia inner end type: T

Caudicle bulb: C

Retinacula character: S ?

***Hoya vitiensis* Turrill 1915**

sent via Ted Green 3 Dec 2007
two flowers in Kew solution.



Two Pollinaria
enlarged about
165x.

The darker colored one to the left is *H. vitiensis* via Ted Green. Smaller one *Mt. Victoria* sp.

Pollinium

length 0.72 mm
widest 0.28 mm

Retinaculum

length 0.25 mm
should. 0.17 mm
waist 0.10 mm
hip 0.11 mm
ext. 0.06 mm

Translator

length 0.17 mm
depth 0.04 mm

Caudicle

bulb. diam. 0.06mm

Translator/caudicle type: ls/o

Pollinia inner end type: R

Caudicle bulb: G

Retinacula character: HU

Hoya sp. India #3

The photos and data below are from the species India #3

This has been called *Hoya pottsii*



Pollinarium enlarged about 165x. Apical side area seems to be rolled under a little on pollinium.

Pollinium

length	0.72 mm
widest	0.20 mm

Retinaculum

length	0.20 mm
shoulders	0.15 mm
waist	0.09 mm
hip	0.10 mm
ext.	0.04 mm

Translators

length	0.09 mm
depth	0.04 mm

Caudicle

bulb diam.	0.03 mm
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Translator/caudicle type: ls/o

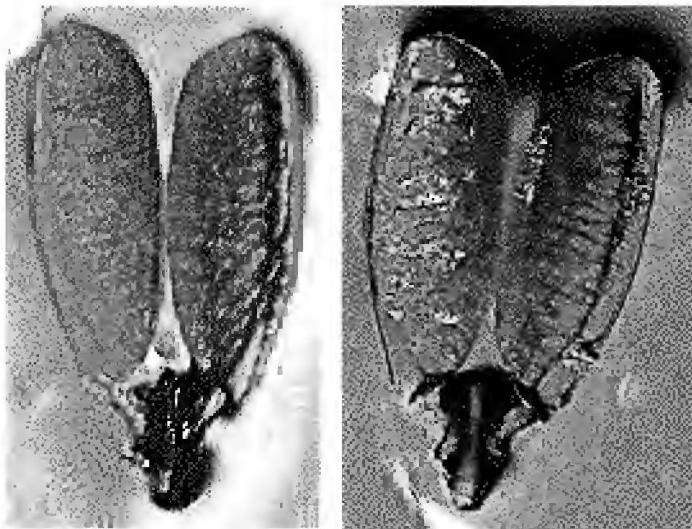
Pollinia inner end type: RT

Caudicle bulb: G

Retinacula type: S

Hoya serpens Hooker f. 1883

Pollinarium from flower via Ann Wayman



Pollinarium shown at two different focal lengths enlarged about 65x. The inner apex of the pollinia are rounded inwardly, the pellucid sterile outer edge extends from the inner apex all the way down the outside near to where the caudicles are attached. The retinacula is well structured and distinctive. Translators and caudicle seem to attach at the waist area.

Pollinarium: clear easy to remove, long.

Pollinium

length	0.72 mm
widest	0.27 mm inner apex rounded inwardly, tapering outwardly to the caudicles.

Retinaculum

length	0.22 mm. long to crotch,
head with wings	0.15 mm
waist	0.11 mm
hips	0.15 mm wide.
extensions	0.06 mm

Translators

length	0.10 mm attached at waist area.
depth	0.02 mm

Caudicles

difficult to discern 0.07 mm.

Translator/caudicle type: ls/o

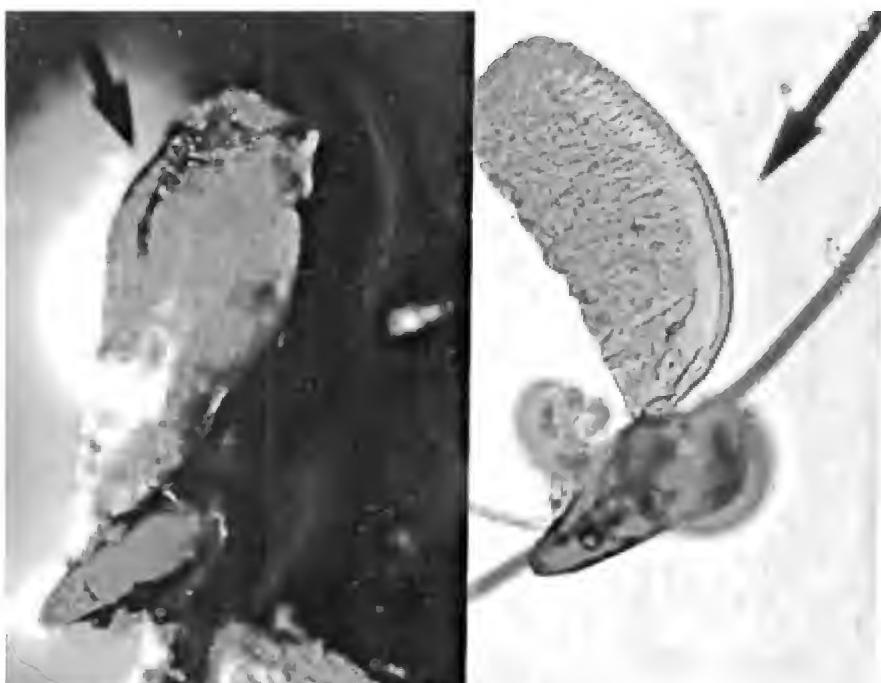
Pollinia inner end type: T

Caudicle bulb: ?

Retinacula character: S



Two photos of pollinaria enlarged about 80x. for some reason they are withered and deformed, unusual for this structure.



Another photo with different results, pollinium on right looks distorted but one on left appears normal. Very difficult to determine precise or accurate measurements.

is:

Best determination

Pollinarium

length	0.71 mm
widest	0.25 mm

Retinaculum

length	0.20 mm
shoulder	0.07 mm
waist	0.05 mm
hip	0.06 mm
ext.	0.08 mm

Translators

length	0.07 mm
depth	0.02 mm

Caudicle

bulb diam.	0.05 mm
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Translator/caudicle type: ls/o

Pollinia inner end type: R

Hoya sp. Fresno Palmate



Pollinarium enlarged
about 165x. Black arrow head
is 0.1 mm long.

Pollinium
length 0.71 mm
widest 0.20 mm

Retinaculum
length 0.16 mm
shoulder 0.12 mm
waist 0.06 mm
hip 0.10 mm
ext. 0.07 mm

Translators
length 0.08 mm
depth 0.04 mm

Caudicle
bulb diam. 0.05 mm

Translator/caudicle Type: ls/o

Pollinia inner end type: R

Retinacula character: HE

Hoya chlorantha var. tutuilensis Christophersen 1975

From flowers at Ted Green's 11 Oct. 2003



Enlarged about 165x.

Pollinia

length	0.71 mm
widest	0.30 mm

Retinaculum

length	0.27 mm
shoulder	0.10 mm
waist	0.06 mm
hip	0.09 mm
ext.	0.03 mm

Translator

length	0.18 mm
depth	0.05 mm

Caudicle

bulb diam. 0.07 mm

Translator/caudicle type: ls/o

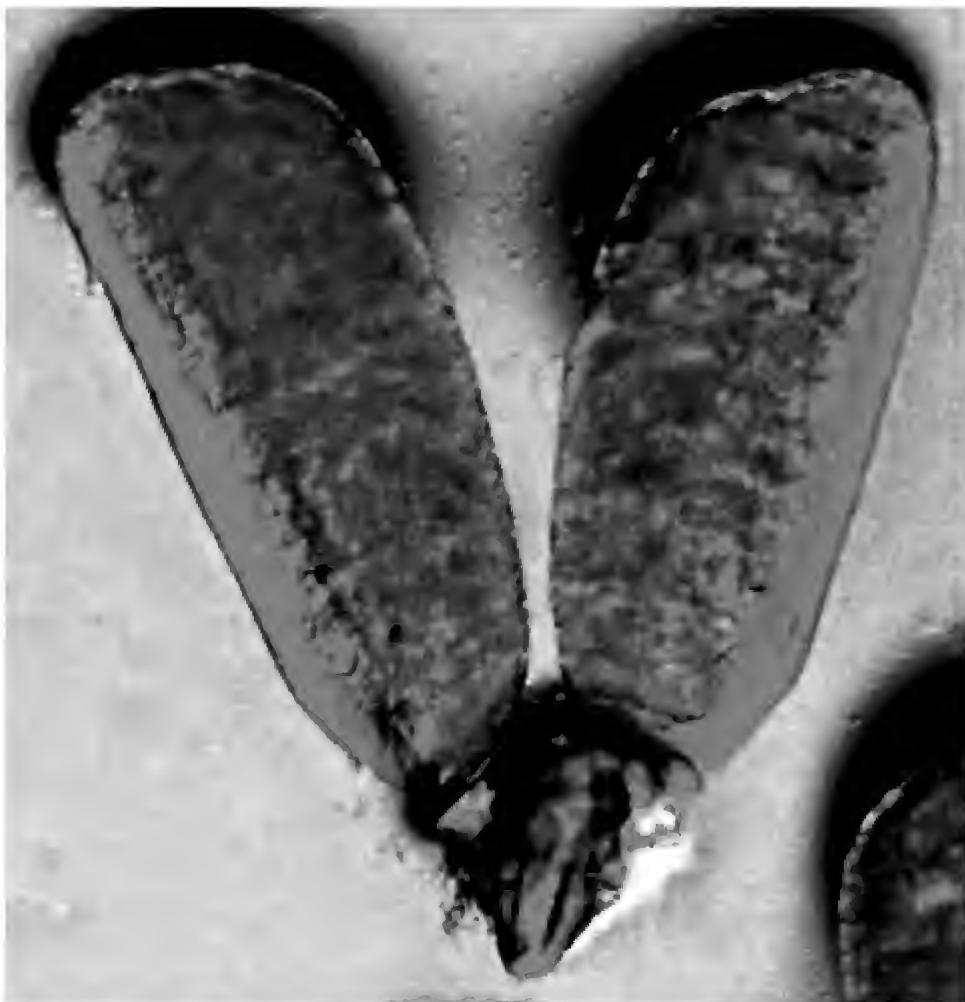
Pollinia inner end type: T

Caudicle bulb: G

Retinacula character: E

***Hoya nicholsoniae* Muller 1866**

Flower from clone IML #39 via AW.



Magnified
Ca. 165x

Pollinium

length: 0.70 mm
widest: 0.30 mm

Retinaculum

length: 0.23 mm
shoulder: 0.17 mm
waist: 0.12 mm
hip: 0.17 mm
ext.: 0.05 mm

Translators

length: 0.08 mm
depth: 0.03 mm

Caudicle bulb diam.

ca. 0.08 mm **Retinacula character:** S

Translator/caudicle type: ls/o

Pollinia inner end type: T

Caudicle bulb: C

Hoya sp. Cl #3
Fresh 5/23/92 draw 216 roll 123-4



Pollinium

length	0.70 mm.
widest	0.14 mm.

Retinaculum

length	0.14 mm.
shoulders	0.06 mm.
waist	0.04 mm.
hip	0.06 mm.
ext.	0.03 mm.

Translators

length	0.04 mm.
depth	0.01 mm.

Caudicle

bulb diam	0.02 mm.
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Translator/caudicle type: ls/o

Pollinia inner end type: R

Caudicle bulb: G

Retinacula character: S

Pollinarium enlarged about 165x. pollinia are very long and narrow.

Hoya naumanii Schlechter 1908
Flower from Ann Wayman, Central Point Oregon.



Pollinarium enlarged about 64X. The pollinia are wide, the translators are short and the retinaculum is not large.

Pollinia

length	0.70 mm
width	0.29 mm

Retinaculum

0.30 mm long. the rest difficult to measure do to its skewed positioning.

Translators

length	0.10 mm
thick.	0.05 mm

Caudicle

ca. 0.09 mm in diameter.

Translator/caudicle type: ls/o

Pollinia inner end type: RT

Caudicle bulb: G

Retinacula character: S ?

Hoya sp. Balasik Is. Sulawesi TG # 94112

11/4/98



Photo of the pollinarium complete. Apices are rounded, pollinia long, relatively uniform width, pellucid edge does not extend all the way down the side. Retinaculum relatively small, shoulders wide, extensions long. Translators enter well up, just below the shoulders and run straight out., and are narrow, caudicle bulb small.

Translator/caudicle type: ls/o

Pollinia inner end type: R

Caudicle bulb: G

Retinacula character: S



Pollinia

length	0.70 mm
widest	0.24 mm

Retinaculum

length	0.20 mm
shoulders	0.18 mm
waist	0.10 mm
hip	0.12 mm
extensions	0.10 mm

Translators

length	0.09 mm
widest	0.05 mm

Caudicle

bulb diameter 0.06 mm

Hoya sanctagoi subsp. mandozae Kloppenburg 2013

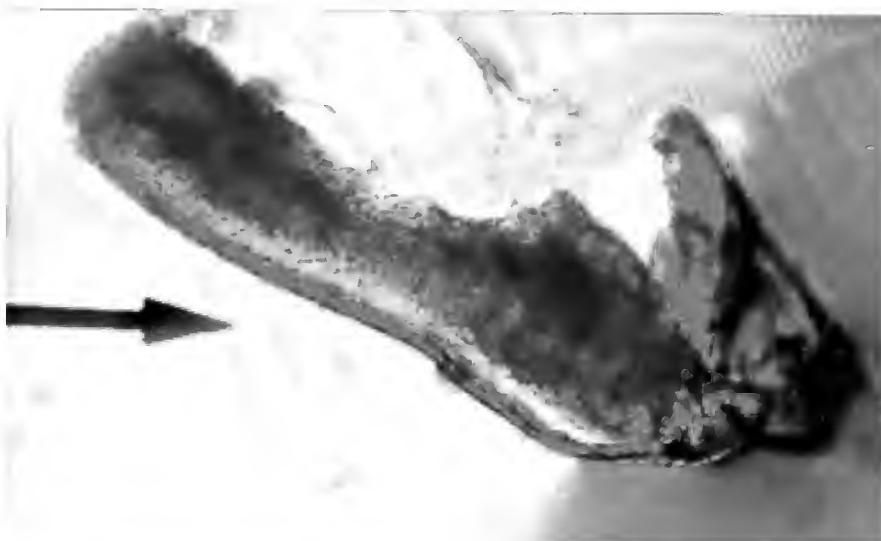


Photo of the pollinarium enlarged about 165x, pollinium has been eaten by bupestids.



Pollinarium	
length	0.70 mm
	0.75 mm
widest	0.22 mm
Retinaculum	
length	0.37 mm
Translators	
length	0.12 mm

Translator/caudicle type: ls/o

Pollinia inner end type: R

Caudicle bulb: G

Hoya betchei (Schltr.) Whistler W 3245

Most likely not this species as retinaculum too large.

Collected by Dr. Whistler 2 Jan 1976, elev. 400m. Upolu, Samoa

Pollinaria enlarged about 165x.
Retinaculum here over the translators and one
pollinium missing.

Pollinium

length	0.70 mm
widest	0.29 mm

Retinaculum

length	0.26 mm
shoulders	0.18 mm
hip	0.12 mm
waist	0.16 mm
extensions	0.06 mm ca.

Translator

length	0.10 mm
depth	0.03 mm

Caudicle bulb

diameter	0.07 mm ca.
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Pollinium and retinaculum attached by the
translator and caudicle but stretched downward.
Both structures are attached in a diagonal hole in the
side of the retinaculum.

Translator/caudicle type: ls/o

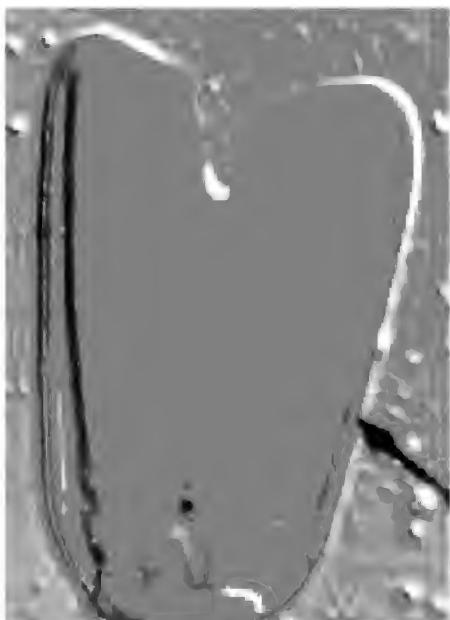
Pollinia inner end type: T

Caudicle bulb: G

Retinacula character: S

Hoya sp. Bangkok 4

flowered at Fresno, CA.



Pollinium enlarged about 85x.

Pollinium

length	0.69 mm
widest	0.21 mm

Retinaculum

length	0.20 mm
shoulders	0.12 mm
waist	0.09 mm
hip	0.08 mm
ext.	0.08 mm

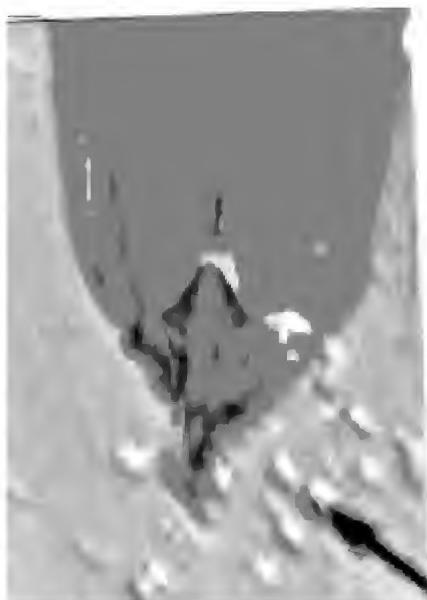
Translators

length	0.10 mm
depth	0.02 mm

Caudicle

bulb diam. 0.09

See below



Translator/caudicle type: ls/o

Pollinia inner end type: T

Caudicle bulb: C

Retinacula character: S

Hoya dolichosparte Schlechter 1916

Flower via AW.



Magnified
approximately 165x.

Translator/caudicle type:
ls/o

Pollinia inner end type: R

Caudicle bulb: C

Retinacula character: S

Pollinium

length	0.69 mm
widest	0.27 mm

Retinaculum

length	0.24 mm
shoulder	0.11 mm
waist:	0.60 mm
hip:	0.10 mm
extensions	0.04 mm

Caudicle

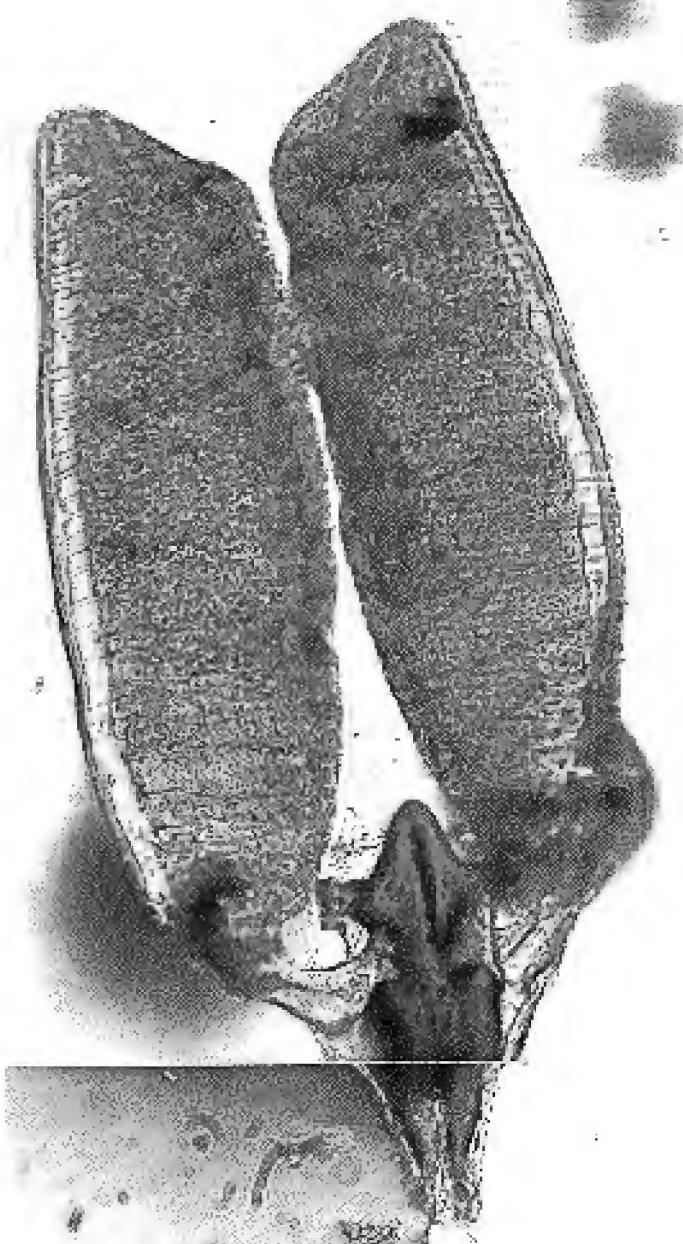
bulb diameter 0.06 mm

Translators

length	0.11 mm
depth:	0.02 mm

***Hoya gildingii* Kloppenburg 2001**

Flowers via Torill Nyhuus, Sweden, who was the first to flower this new species.
From the **type** material



A composite of two micro-photos of this large pollinarium, here enlarged about 165x. Details covered under pollinarium above. The most notable thing I see here is the winged head area on the retinaculum and much rounded hip area almost cordate. The retinaculum also has long well defined extensions on the lower apex. This structure contrasts to all of Dr. Schlechter's Section *Physostelma* species which all have minute retinaculum.

Pollinarium: relatively large with a long retinaculum with a distinctive long waist, and rounded broad hip area. Pollinia long tapering inward from the apex, caudicle bulbous, adhering to the rounded inner pollinium apex. Translators narrowly wedge shaped broadest near the retinaculum. This species has an unusual flared skirt like structure tight at the end of the retinaculum extensions flaring out to partially envelop the retinaculum.

Pollinia

length	0.69 mm
widest	0.22 mm

with pellucid outer edge, a narrow vacuole inward.

Retinaculum

length	0.34 mm
shoulders	0.12 mm
waist	0.05 mm

hips	0.11 mm
extensions	0.10 mm (included in retinacular length)

Translator

length	0.11 mm
depth. ca.	0.02 mm

Caudicle

bulbous portion	0.10 mm diameter.
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Translator/caudicle type: ls/o

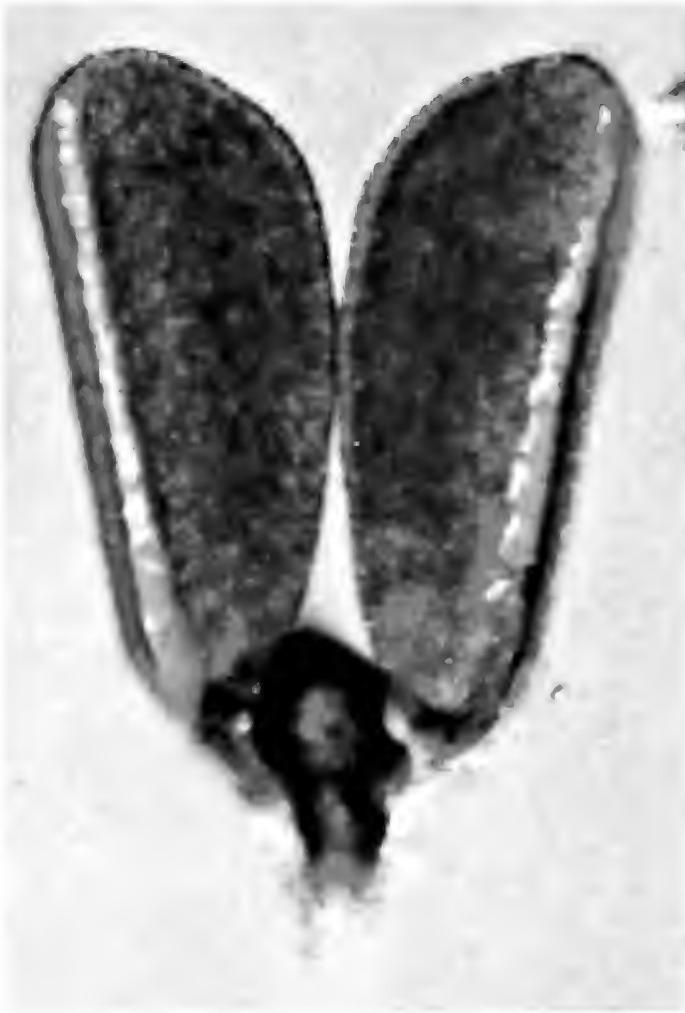
Pollinia inner end type: T

Caudicle bulb: G

Retinacula character: S

Hoya cumingiana Decaisne 1844

Grown and flowered in Fresno, CA.



Magnified approximately
165x.

Translator/caudicle type: ls/o

Pollinia inner end type: T

Caudicle bulb: ?

Retinacula character: R

Pollinium

length	0.69 mm
widest	0.27 mm

Retinaculum

length	0.25 mm
shoulder	0.15 mm
waist	0.07 mm
hip	0.09 mm
ext.	0.03 mm

Translators

length	0.10 mm
depth	0.02 mm

Caudicle bulb diameter 0.05 mm

Hoya sp. PNH 806



Translator/caudicle type: ls/o

Pollinia inner end type: R

Pollinarium enlarged about 165x. Measure scale above 0.1 mm between long lines.

Pollinium

length 0.68 mm
widest 0.30 mm

Retinaculum

length 0.45 mm
widest 0.25 mm
ext. 0.10 mm

Hoya acuta Haworth 1821

Seedling via MM, Hawaii.

Flowered in Fresno, CA., USA. Now I believe this is H. ridleyi



Magnified approximately 165x.

Pollinium

length: 0.68 mm
widest: 0.24 mm

Retinaculum

length: 0.29 mm
shoulder: 0.11 mm
waist: 0.08 mm
hip: 0.13 mm
ext.: 0.06 mm

Translators

length: 0.07 mm
depth: 0.03 mm

Caudicle

bulb diam.: 0.07 mm

Translator/caudicle type: ls/o ?

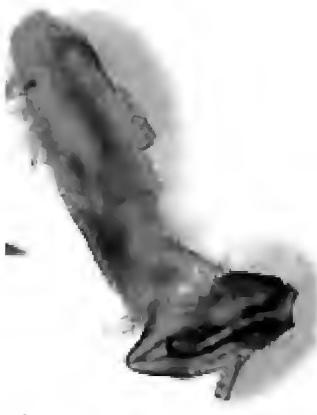
Pollinia inner end type: T

Caudicle bulb: ?

Retinacula character: HE ?

Hoya vitiensis Turrill 1915

Photomicrographs follow, flowers from Herbarium sheet (UC) #20723. Piti Levu, Fiji H. E. Parks. Two different flowers?



Pollinarium enlarged about 83x. The retinacular head is to the bottom left.

Retinaculum

length	0.27 mm
shoulders	0.16 mm
waist	0.09 mm
hips	0.16 mm
extensions	nill

Translator

length	0.01 mm
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Pollinium enlarged about 83x. Top and base rounded, (obtuse).

Pollinia

length	0.68 mm
widest	0.27 mm

Translator/caudicle type: ls/o

Pollinia inner end type: RT

Caudicle bulb: ?

Retinacula character: HE

Hoya odorata Schlechter, UC 13860

Collected by A. Loher at Oriud, Rizal, Philippines, March 1914
Data 6/19/90



Pollinarium enlarged about 165x.
Pollinium long and narrow.

Pollinium

length	0.68 mm
widest	0.20 mm

Retinaculum

length	0.34 mm
shoulder	0.18 mm
waist	0.08 mm
hip	0.10 mm
ext	0.04 mm

Translator/caudicle type: ls/o

Pollinia inner end type: R

Caudicle bulb: ?

Retinacula character: HE

Hoya sp. medium flower Sulawesi

Pollinarium, 2 pictures enlarged about 165X. The translators are very short, caudicles same. Retinaculum is also minute with a rounded head, no distinct waste nor hip and extensions.



Pollinium

length	0.65 mm
widest	0.27 mm

A third photograph which better shows the retinaculum with its rounded head, small size. Here the short translators are visible especially at the upper side bit the caudicles are indistinct.



Retinaculum

length	0.23 mm
widest	0.16 mm

Pollinia Types 2018-1B ls/o or ls/r (continued)

83. **Hoya dischorensis** Schlechter 1913
84. **Hoya acuta** Haworth 1821 ?
85. **Hoya sp.** (UC) 20732 (vitiensis)
86. **Hoya golamcoiana** Kloppenburg 1991
87. **Hoya chlorantha** Rechinger 1908
88. **Hoya chlorantha** Rechinger 1908 (My coll.)
89. W 3111 as **Hoya betchei**, determined to be **Hoya chlorantha**
90. **Hoya fetuana** Subsp. **tutuilensis** Kloppenburg 2017
91. **Hoya savaiiensis** subsp. **falealupoensis** Kloppenburg 2015
92. **Hoya fetuana** Kloppenburg 2003\
93. **Hoya seanwhistleriana** Kloppenburg 2015
94. W 8717 as **Hoya vitiensis** cf. **Hoya fetuana**
95. **Hoya shephardii** Short ex Hooker 1861
96. **Hoya cumingiana** subsp. **rezalensis** Kloppenburg, Guevarra & Carandang
97. **Hoya sp.** Matafoao Ridge Am. Samoa, Yellow
98. **Hoya cf. amoena** Ted Green 2014
99. **Hoya finlaysonii** Wight 1834
100. **Hoya sp. laurifolia** (not)
101. **Hoya cumingiana** subsp. **biloba** Kloppenburg & Mendoza
102. **Hoya whistlerii** Kloppenburg 2002
103. **Hoya recurvula** subsp. **bokorensis** Kloppenburg & Yap 2010
104. **Hoya meredithii** x **crassicaulis**
105. sp. 61933 (CAHUP)
106. **Hoya sp.** Sabah, Malaysia
107. **Hoya odorata** Schlechter 1906 (a Loher sp.)
108. **Hoya sp.** PNG #4
109. **Hoya obovata** Decaisne 1
110. **Hoya diversifolia** ssp. **chlorina** Kloppenburg & Cajano
111. **Hoya subquintuplinervis** Miquel 1869
112. **Hoya monetteae** Green 2004
113. **Hoya samoensis** subsp. **savai'iensis** Kloppenburg 2017
114. **Hoya samoensis** W1506 Upolu
115. **Hoya mindorensis** ssp. **cremea** Kloppenburg & Mendaza
116. **Hoya medinai** Kloppenburg 2017
117. **Hoya cumingiana** subsp. **flosviridia** Kloppenburg, Guevarra & Carandang
118. **Hoya kerrii** Craib 1911 (Thailand white)
119. **Hoya kerrii** Craib 1911 (Marin Cactus)
120. **Hoya bandongii** Kloppenburg & Ferreras 2011
121. **Hoya sp.** Ben Vergara #56
122. **Mt. Matavai, Samoa** Green (West)
123. **Hoya sp.** Sulawesi med. Flower
124. **Hoya tannaensis** T. Green & D. Kloppenburg Type clone 2011
125. **Hoya gretherii** Kloppenburg 2017
126. **Hoya quisumbingii** Kloppenburg 2017

127. **Hoya ofuensis** Kloppenburg 2015
 128. **Hoya diversifolia** Blume 1826
 129. **Hoya** sp. Samoa double
 130. **Hoya** sp. W 8798
 131. **Hoya matavauensis** Kloppenburg 2011
 132. **Hoya tiatuliensis** Kloppenburg 2013
 133. **Hoya smithii** Kloppenburg 2010
 134. **Hoya whistleri** subsp. **faleuluensis** Kloppenburg 2017
 135. **Hoya** sp. Matoata Cream 2003
 136. **Hoya** sp. flowered by Astrid Boström via Torill Nyuus, Sweden
 137. **Hoya longifolia** Wallich ex Wight 1834
 138. **Hoya golamcoiana** Kloppenburg 1991
 139. **Hoya** sp. CAHUP 18680 as *H. cumingiana* Decaisne
 140. **Hoya** sp. Ramos & Edano (UC) 49328
 141. **Hoya ramosii** Kloppenburg & Siar 2007
 142. **Hoya cominsii** Hemsley 1890
 143. **Hoya kerrii** Craib 1911 (hairy)
 144. **Hoya corollamarginata** ssp. **upoluensis** Kloppenburg 2017
 145. **Hoya betchei** (Schltr.) Whistler 1978
 146. **Hoya mindorensis** subsp. *nagcarlanensis* Kloppenburg, Mendoza
 147. **Hoya savaiiensis** Kloppenburg & Whistler 2009
 148. W 9456 Savai'i
 149. **Hoya** sp. PNH 7889
 150. **Hoya hainanensis** Merrill 1929
 151. **Hoya pauciflora** Wight 1848
 152. **Hoya quinquinqrvia** (UC) 1013
 153. **Hoya diversifolia** subspecies **elnidicus** Kloppenburg 1991
 154. **Hoya marginata** Schlechter 1905
 155. **Hoya telosmoides** Omlar 1996
 156. **Hoya uncinata** Teijsmann & Binnendijk 1863
 157. **Hoya vitellinioides** Bakhuizen Brink f. 1950
 158. **Hoya fitoensis** Kloppenburg 2015
 159. **Hoya** sp. W 1106 (filiformis)
 160. **Hoya lamingtoniae** Bailey 1898
 161. **Hoya** sp. UC 295, F. H. Bolster
 162. **Hoya hamiltoniorum** Lamb et al. 2014
 163. **Hoya gigantangensis** Kloppenburg 1992
 164. **Hoya uafatoensis** Kloppenburg 2017
 165. **Hoya isabelaensis** Kloppenburg, Siar & Ferreras 2011
 166. **Hoya odorata** Schlechter CAHUP 19258
 167. **Hoya mindorensis** ssp. *hirsuta* Kloppenburg
 168. **Hoya landgrantensis** Kloppenburg 2009
 169. **Hoya coronaplanata** Kloppenburg & Mendoza
 170. **Hoya tauensis** Kloppenburg 2011
 171. **Hoya cumingiana** subsp. *kamangongensis* Kloppenburg & Mendoza
 172. **Hoya cumingiana** ssp. *catanduanesensis* Kloppenburg & Mendoza 2017

173. ***Hoya teodymendozae*** Kloppenborg & Mendoza
174. ***Hoya sulitii*** Kloppenborg 2015
175. ***Hoya crassicaulis*** Elmer ex Kloppenborg 1995
176. W 2705 as *H. filiformis* not
177. ***Hoya landgrantensis*** subsp. *siniloanensis* Kloppenborg
178. ***Hoya blashernaezii*** ssp *bigaensis* Kloppenborg
179. ***Hoya coronaplanata*** subsp. *bakyaanensis* Kloppenborg, Mendoza
180. ***Hoya mucronulata*** Warburg 1901
181. ***Hoya ranauensis*** T. Green & D. Kloppenborg 2014
182. ***Hoya tamaleaaana*** Kloppenborg 2008
183. ***Hoya luatekensis*** Kloppenborg 2017
184. ***Hoya* sp. PNH 5733**
185. Poring Hot Springs, Saba, Malaysia TG
186. ***Hoya persicina*** subsp. *triapexa* Kloppenborg & Mendoza
187. ***Hoya blashernaezii*** subsp. *diluta* Kloppenborg & Cajano
188. ***Hoya corollanervia*** Kloppenborg & Mendoza

Hoya dischorensis Schlechter 1913

Flower from TG, clone flowered in Hawaii. I have determined this flower to be *Hoya dischorensis* Schlechter and not *Hoya ischnopus* as original stated.



Pollinarium enlarged
about 165x.

Pollinia

length	0.68 mm
widest	0.22 mm

Retinaculum

length	0.17 mm
shoulder	0.10 mm
waist	0.07 mm
hip	0.09 mm
ext.	0.06 mm

Translator

length	0.11 mm
depth	0.02 mm

Caudicle

bulb diam. 0.06 mm

Translator/caudicle type: ls/o

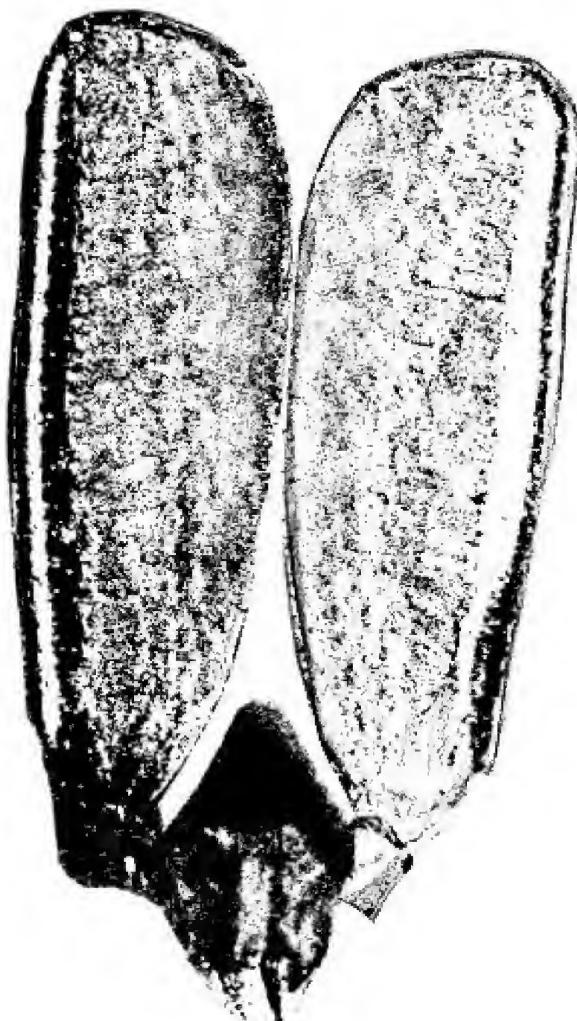
Pollinia inner end type: R

Caudicle bulb: C

Retinacula character: S

Hoya acuta Haworth 1821 ?

Clone from CT, Thailand, foliage looks like *H. finlaysonii* Wight.



Magnified approximately 165x.

Pollinium

length:	0.67 mm
widest:	0.23 mm.

Retinaculum

length:	0.22 mm
shoulder:	0.16 mm
waist:	0.10 mm
hip:	0.12 mm
ext.:	0.05 mm

Translators

length:	0.12 mm
depth:	0.02 mm

Caudicle

bulb. diam.: 0.04 mm

Translator/caudicle type: ls/o

Pollinia inner end type: R

Caudicle bulb: C

Retinacula character: HE

Hoya sp. (UC) 20732
Hoya vitiensis Turrill



Magnified approximately 165x.

Pollinium

length:	0.67 mm
widest:	0.28 mm

Retinaculum

length:	0.25 mm
shoulder:	0.13 mm
waist:	ca. 0.07 mm
hip:	0.09 mm
ext.:	0.04 mm

Translators

length:	0.16 mm
depth:	0.03 mm

Caudicle

bulb. diam. ca. 0.10 mm

Translator/caudicle type: ls/o ?

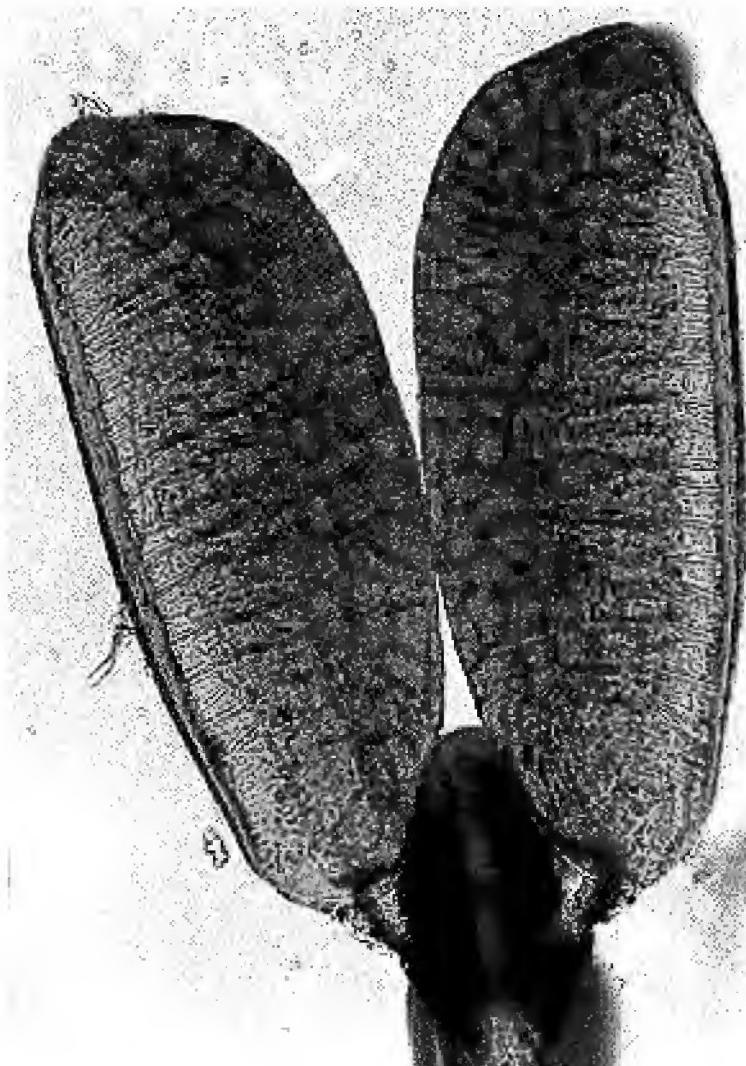
Pollinia inner end type: R

Caudicle bulb: ?

Retinacula character: S

Hoya golamcoiana Kloppenburg 1991

Flower from Type clone via Edward Gilding, Pearl City, HI.



length	0.20 mm
shoulders	0.15 mm
waist	0.06 mm
hip	ca. 0.10 mm
extensions	0.5 mm long

Translators

length 0.11 mm
wide a little over 0.1 mm thick and possibly a little wider.

Caudicle

bulb not distinct ca. 0.06 mm

Translator/caudicle type: ls/o

Here the pollinaria is enlarged about 165x. Not shown here are very wide hip shelves on the retinaculum, which would be distinctive of this species. The pollinia are relatively short and wide, translators are small and short, and caudicles are also small.

Pollinarium: pollinia very wide at outer apex still wide in center but then narrowing toward a rounded inner apex. Translators relatively short and narrow in side view. Retinaculum with rounded head, not wide at shoulder but with almost shelf like protrusions in the hip area, extensions held tight.

Pollinia

length 0.67 mm
widest 0.26 mm
pellucid edge and wide vacuole.

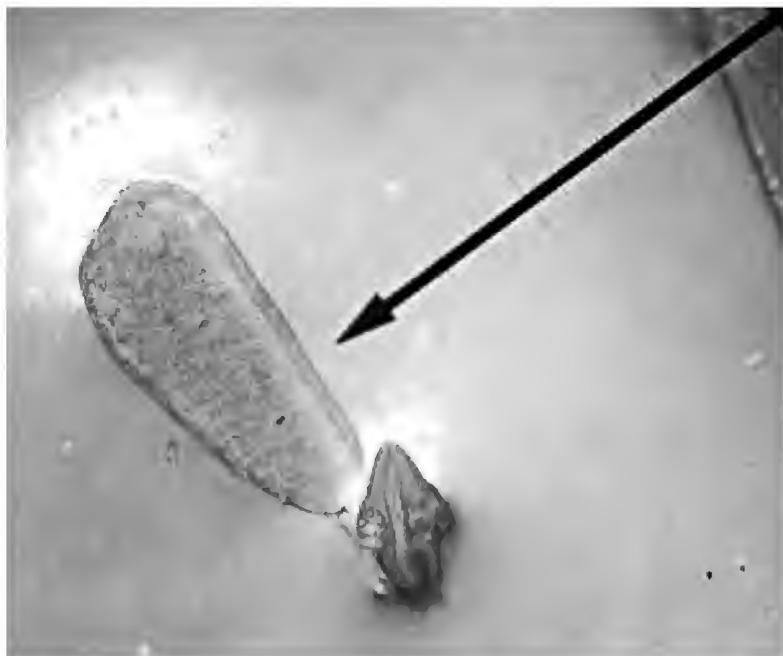
Retinaculum

Pollinia inner end type: T

Caudicle bulb: ?

Retinacula character: R

Hoya sp. CAHUP 18680 as *H. cumingiana* Decaisne



Pollinarium enlarged
about 165x .

Pollinium

length	0.55 mm
widest	0.23 mm

Retinaculum

length	0.22 mm
shoulder	0.14 mm
waist	0.08 mm
hip	0.10 mm
ext.	0.03 mm

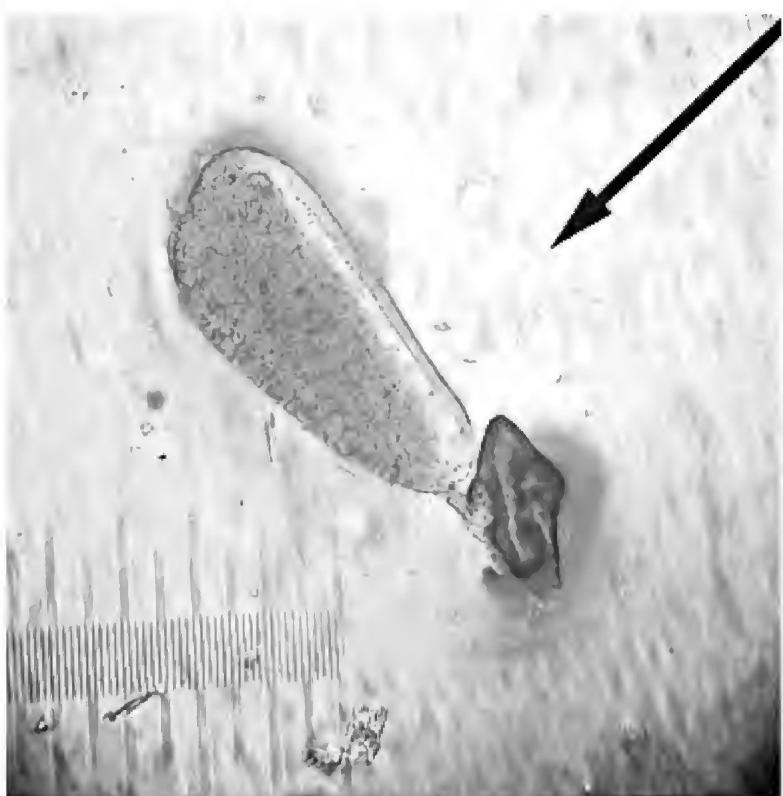
Translators

length	0.07 mm
depth	0.02 mm

Caudicle bulb
diameter 0.07 mm

Translator/caudicle
type: ls/o

Pollinia inner end
type: R



A second photo of the pollinarium. As above the pollinium has turned on the axis and the pellucid edge in inward. Outer apex is widely rounded, translators are short and narrow, caudicle bulb not well defined. Here the retinacular measurements were slightly smaller.

Hoya chlorantha Rechinger 1908

From herbarium sheet #10477 collected on Upolu by Art Whistler.



Pollinaria enlarged a little less than 165x. It is difficult here to get the exact measurements of the structure as indicated below.

Pollinia

length	0.67 mm
widest	0.23 mm

Retinaculum

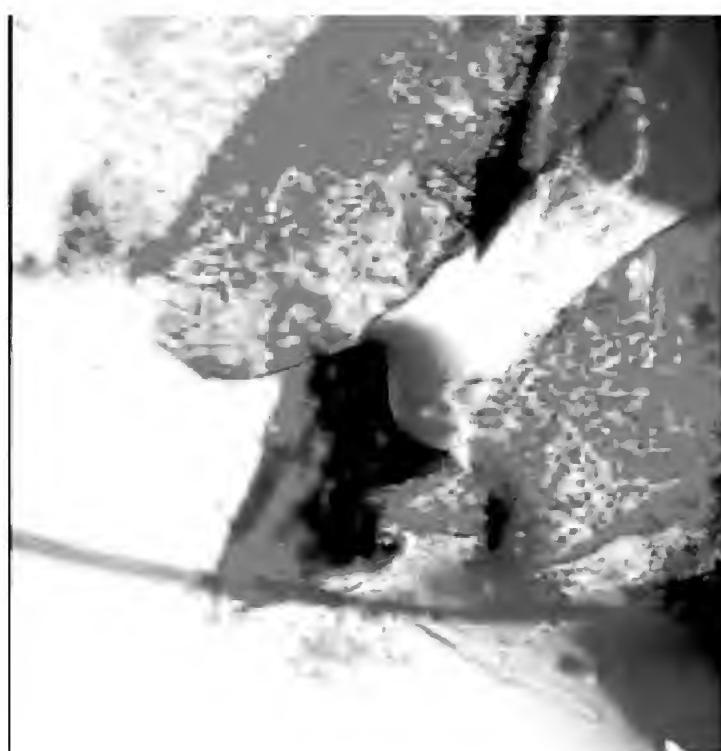
length	0.17 mm
shoulders	0.20 mm
waist	0.08 mm
hip	0.12 mm

Translator

length	0.14 mm
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Caudicle

bulb diam.	0.06 mm
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Note the differences in the retinaculum structure all due to focus and focal depth. Here again as with many Samoan species the shoulders curve backwards.

Translator/caudicle type: ls/o

Pollinia inner end type: T

Caudicle bulb: ?

Retinacula character: HU

Hoya chlorantha Rechinger 1908
From live material collected in American Samoa



Pollinarium enlarged about 165x. End of pollinia truncate, base rounded, pellucid edge from outer apex to near base.

Pollinium

length	0.66 mm
widest	0.28 mm

Retinaculum

length	0.20 mm
shoulders	0.19 mm
waist	0.07 mm
hip	0.13 mm
extensions	0.03 mm

Translators

length	0.12 mm
depth	0.02 mm

Caudicle

bulb diameter 0.10 mm

Caudicle bulb clear, flattened into a saucer by the end of the pollinium. On the right arm it is small, some may have been pulled away with the missing pollinium.

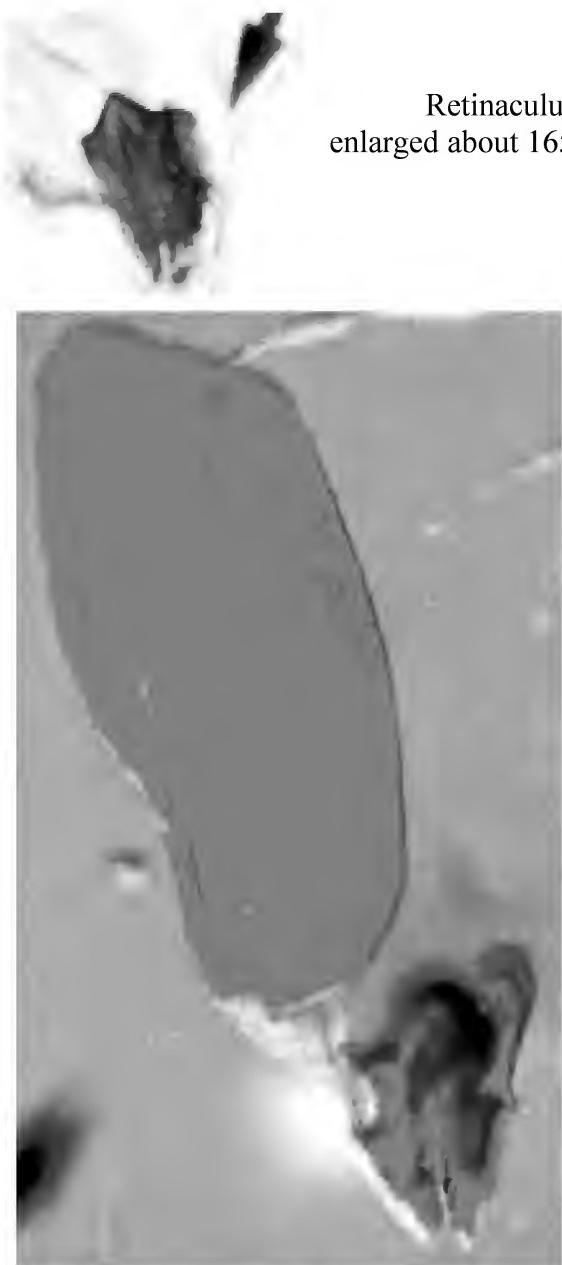
Translator/caudicle type: ls/o

Pollinia inner end type: T

Caudicle bulb: C

Retinacula character: HU

W 3111 as *Hoya betchei*, determined to be *Hoya chlorantha*



Retinaculum and attached translator arm on left side
enlarged about 165x. Measurements below.

Pollinium enlarged about 165x.
End of pollinia truncate, base rounded,
pellucid edge from outer apex to near base.

Pollinium

length	0.66 mm
widest	0.28 mm

Retinaculum

length	0.20 mm
shoulders	0.19 mm
waist	0.07 mm
hip	0.13 mm
extensions	0.03 mm

Translators

length	0.12 mm
depth	0.02 mm

Caudicle bulb

diameter	0.10 mm
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Caudicle bulb clear, flattened into a saucer by the end of the pollinium. On the right arm it is small, some may have been pulled away with the missing pollinium.

Translator/caudicle type: ls/o **Pollinia inner end type:** T
Caudicle bulb: C

Retinacula character: HU

Description of the above herbarium sheet W 3111:

Hoya betchei (Schltr.) Whistler, 13 Aug. 1975 Tutuila, Samoa.

Hoya fetuana Subsp. tutuilensis Kloppenburg 2017
sp. W 3110

Labeled H. betchei var. tutuilensis. Collected by Dr. Whistler 13 Aug. 1975. Tutuila, Samoa
Flowers maroon, elevation 250 m.

Pollinarium enlarged about 165x. Object distorted with one pollinium missing.



Pollinium

length	0.65 mm
Widest	0.23 mm

Retinaculum

length	0.21 mm
shoulder	0.18 mm
waist	0.08 mm
hip	0.12 mm
extensions	0.07 mm

Translator

length	0.14 mm.
depth	0.03 mm.

Caudicle

bulb diameter 0.05 mm.

Translator/caudicle type: ls/o

Pollinia inner end type: R

Caudicle bulb: G

Retinacula character: HU

***Hoya savaiensis* subsp. *falealupoensis* Kloppenburg 2015**



Pollinarium enlarged about 165 x.

Pollinium

length	0.65 mm
widest	0.25 mm

Retinaculum

length	0.24 mm
shoulders	0.18 mm
waist	0.10 mm
hip	0.15 mm
extensions	0.05 mm

Translator

length	0.15 mm
depth	0.02+ mm

Translator/caudicle type: ls/o

Pollinia inner end type: S
(truncate)

Retinacula type: S (shield) but
nearly Hands up HU)

Hoya fetuana Kloppenburg 2003
Type material W 2865 (UHAW)



Pollinarium enlarged about 165x.

The retinaculum is skewed a little so there is thee normal flat on view below. In this photo the dome shaped caudicle bulb is plainly visible at the base end of the pollinium, supported by the translator arm. In this view it is evident that the shoulders of the retinaculum curve backward (Right side). The pollinium is a little distorted on the lower right side.

Pollinium

length	0.65 mm
widest	0.23 mm

Retinaculum

length	0.25 mm
shoulders	0.18 mm
hip	0.08 mm
waist	0.14 mm
extensions	0.08 mm

Translators

length	0.15 mm
depth	0.03 mm

Caudicle

bulb diam.	0.08 mm
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Translator/caudicle type: ls/o

Pollinia inner end type: R

Caudicle bulb: G

Retinacula character: S

Retinacula and translators; caudicles.

Hoya seanwhistleriana Kloppenburg 2015
Type clone



Pollinarium enlarged about 82x.

Pollinia

length	0.65 mm
widest	0.24 mm

Retinaculum

length	0.23 mm to crotch
shoulder	0.19 mm
waist	0.13 mm
hip	0.18 mm
extension	0.13 mm

Translator

length	0.26 mm
depth	0.02 mm

Caudicle

bulb diam.	0.06 mm
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More detailed photo of the lower pollinia area and the small caudicles and short translator arms along with the retinaculum, enlarged as above. There is a wide vacuole on the inner end of the pollinia. a small clear bulbous caudicle supported by narrow up curved short translator arms.

Translator/caudicle type: ls/o

Pollinia inner end type: R (round)

Caudicle bulb: C

Retinacula character: S

W 8717 as *Hoya vitiensis* cf. *Hoya fetuana*



Pollinarium enlarged about 165x.

Pollinium

length	0.64 mm
widest	0.23 mm

Retinaculum

length	0.22 mm
shoulders	0.15 mm
waist	0.06 mm
hip	0.12 mm
extensions	0.05 mm

Translator

length	0.10 mm
depth	0.01 mm

Caudicle bulb

diameter	0.05 mm
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Translator/caudicle type: ls/o

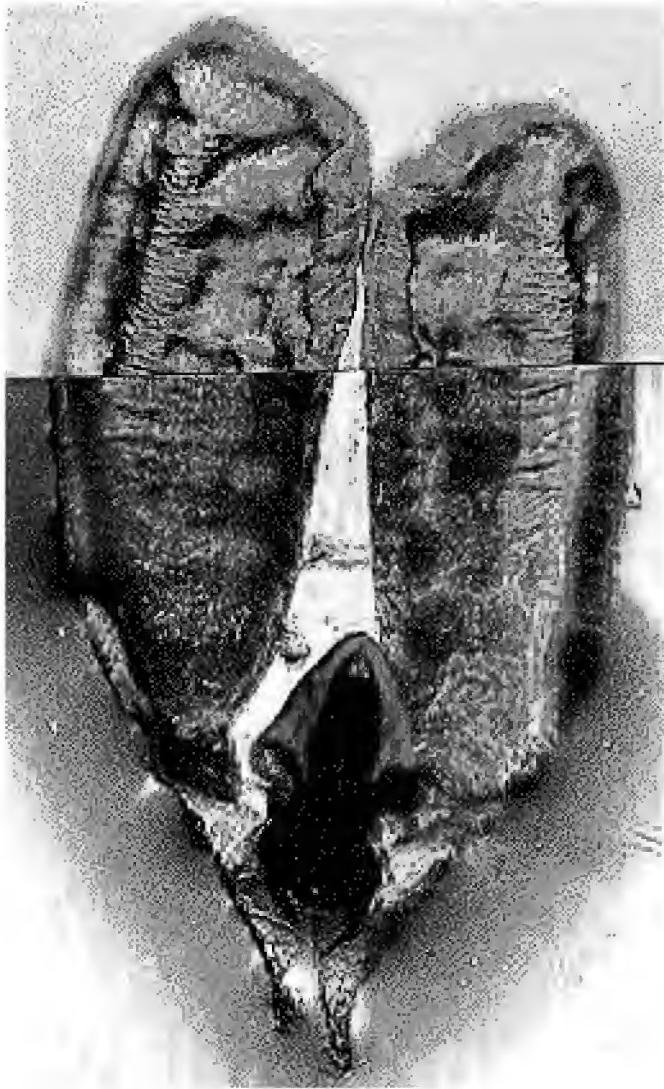
Pollinia inner end type: R (round)

Caudicle bulb: G

Retinacula character: HU

Hoya shephardii Short ex Hooker 1861

Flowered at Fresno, CA.



Pollinia inner end type: RT

Caudicle bulb: ?

Pollinaria made up of
Two composite pictures (wouldn't fit in one frame) at 165 magnifications. The translators are relatively long, the retinaculum here is pretty well defined with a long head portion, fairly broad and long with well pollinia developed vacuoles and pellucid edge.

Pollinium

length:	0.64 mm
widest:	0.23 mm

Retinaculum

length:	0.24 mm
shoulder:	0.10 mm
waist:	0.08 mm
hip:	0.11 mm
ext.:	0.04 mm

Translators

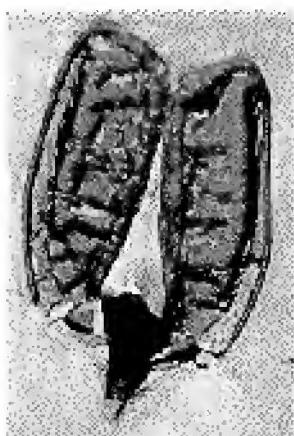
length:	0.12 mm
depth:	0.02 mm

Caudicle

bulb diam:	0.03 mm
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Translator/caudicle type: ls/o

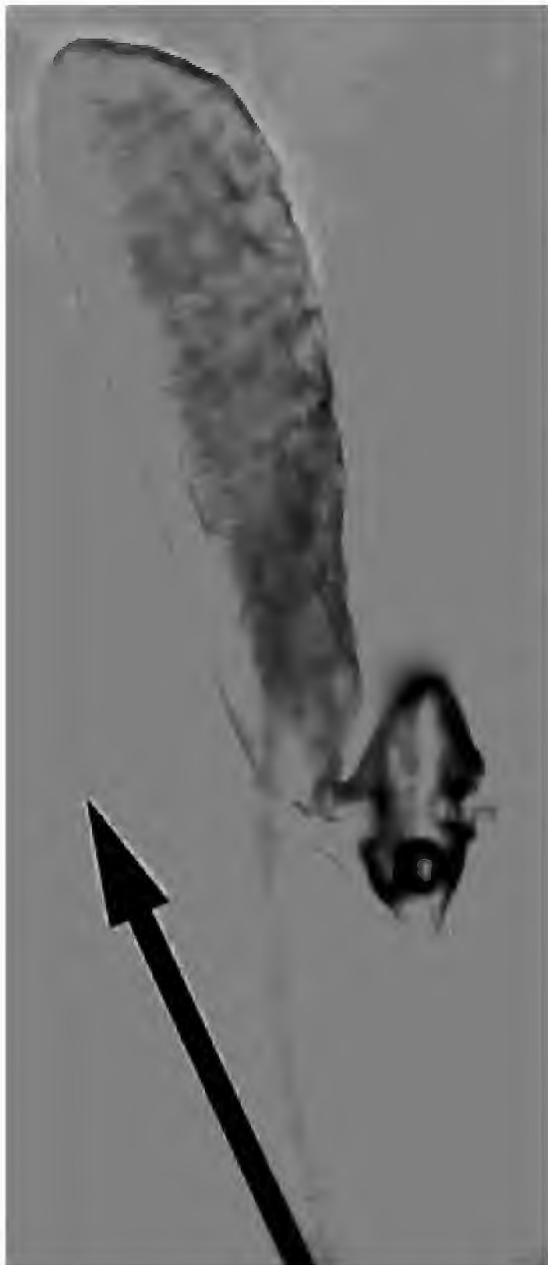
Retinacula character: S ?



Another photo of the pollinaria at a lower power, here enlarged about 65x. Note the apparent differences in the retinacula here and above, a difference only of focal length. Here the translators are more readily visible as is the well-developed caudicle.

***Hoya cumingiana* subsp. *rezalensis* Kloppenburg, Guevarra & Carandang
(unpublished) 2012-7-075**

Pollinaria below on the left enlarged 160x, on the right 110x.



Pollinium

length	0.64 mm
widest	0.20 mm

Retinaculum

length	0.17 mm
shoulder	0.15 mm
waist	0.07 mm
hip	0.10 mm
ext.	0.04 mm

Translator

length	0.11 mm
widest	0.04 mm

Caudicle

bulb diam. 0.05 mm

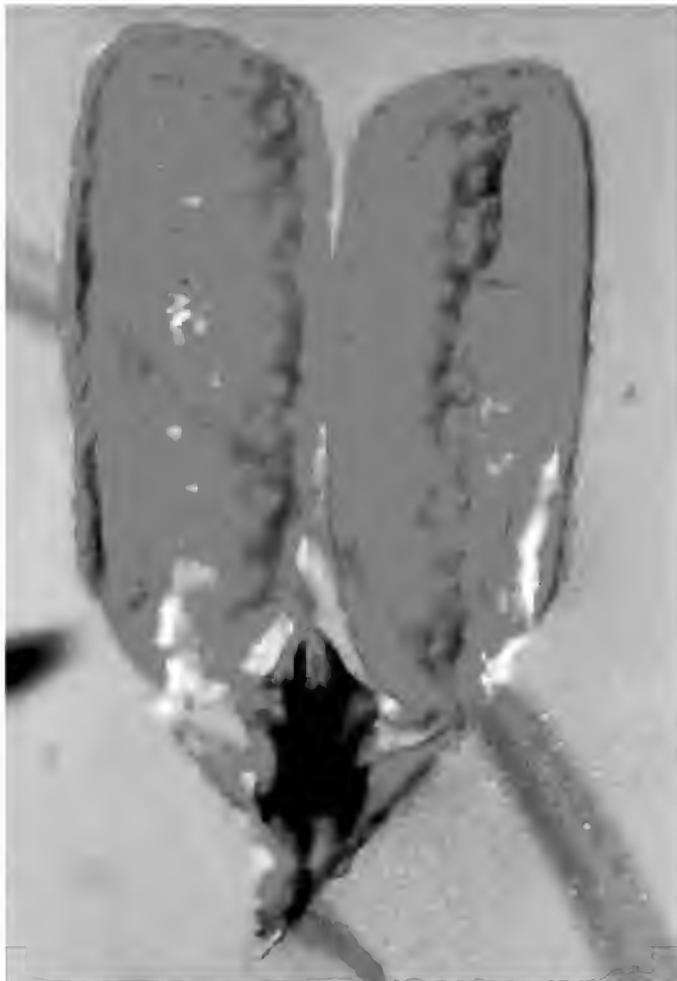
Translator/caudicle type: ls/o

Pollinia inner end type: T

Caudicle bulb: ?

Hoya sp. Matafoao Ridge Am. Samoa, Yellow

Collected October 2003 2/3 way up the hog-back ridge to the West, where the trail turns South to the Peak. A butter clear yellow flower cluster dangling from a vine from there, leaves fairly large, pinnately nerved.



Pollinaria enlarged about 65x. The species has a well defined retinacula and in the pollinium the vacuole (or fluid space along the pellucid edge is wide.

Pollinia

length	0.64 mm
widest	0.23 mm

Retinaculum

length	0.17 mm
shoulder	0.13 mm
hip	0.07 mm
waist	0.11 mm
ext.	0.05 mm

Translators

length	0.10 mm
depth	0.04 mm

Caudicle

bulb diam.	0.07 mm
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Translator/caudicle type: ls/o

Pollinia inner end type: R

Caudicle bulb: C

Retinacula character: S

Hoya cf. amoena Ted Green 2014



Pollinaria here enlarged
ca. 120x.

Pollinium

length	0.64 mm
widest	0.23 mm

Retinaculum

length	0.15 mm
shoulder	0.14 mm
waist	0.08 mm
hip	0.10 mm
ext	0.10 mm

Translator

length	0.08 mm
widest	0.05 mm

Caudicle

bulb diam.,	0.05 mm
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Translator/caudicle type:
ls/o

Pollinia apex type: R

Caudicle: clear.

Retinacula Type: S

***Hoya finlaysonii* Wight 1834**

Flowered at Fresno, CA. via Thailand. Labeled as "pale" from South Thailand

Pollinarium enlarged about 165x.



Pollinia

length	0.64 mm
widest	0.21 mm

Retinaculum

length	0.21mm overall.
shoulders	0.12 mm
waist	0.08 mm
hip	0.09 mm
extensions	0.06 mm

Translators

length	0.11 mm
depth	0.01 mm

Caudicle

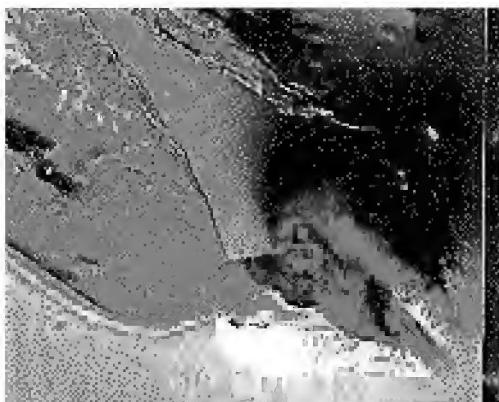
bulb diameter 0.05 mm.

Translator/caudicle type: ls/o

Pollinia inner end type: R

Caudicle bulb: G

Retinacula character: S



I wanted to show the unusual shoulder area of the retinaculum here enlarged about 165x. The extensions are also long and thick clear caudicles supported by the more opaque translators. The actual retinaculum is relatively short and stubby.

Amongst the species in commerce labeled as this species there appears to be more than one species.

Hoya sp. laurifolia

This flower was sent by Michael Miyashiro from Ted Green originally, photographed in 5/17/90. It is not the species (see that file and the drawing of the species). Here presented as an unknown for now:

Pollinarium enlarged about 84x. This is an unusual pollinarium with the attachments well down on the retinaculum. *Hoya erythrina* Rintz has the most similar pollinarium but also compare with *Hoya meridithii* Green.



Pollinia

length	0.64 mm
widest	0.19 mm

Retinaculum

length	0.17 mm without extensions.
shoulder	0.10 mm
waist	0.09 mm
hip	0.11 mm
extensions	0.04-0.09 mm

Can not determine other measurements.

Translator/caudicle type: ls/o

Pollinia inner end type: R

Caudicle bulb: ?

Retinacula character: S

***Hoya cumingiana* subsp. *biloba* Kloppenburg & Mendoza**
(unpublished) GM #174



Pollinaria with one pollinia missing, enlarged 180x.

Pollinium

length	0.63 mm
widest	0.17 mm

Retinaculum

length	0.18 mm
shoulder	0.12 mm
waist	0.08 mm
hip	0.09 mm
extensions	0.07 mm

Translator

length	0.14 mm
widest	0.02 m

Caudicle

bulb diam.	0.04 mm
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Translator/caudicle type:
ls/o

Pollinia apex type: T

Caudicle bulb: C

Retinacula character: R

***Hoya whistlerii* Kloppenburg 2002**

Ta'u Is., Samoa. Type
Flower via TG, collector Art Whistler.



Magnified approximately 165x.

Pollinium

length:	0.63 mm
widest:	0.20 mm

Retinaculum

length:	0.21 mm
shoulder:	0.14 mm
waist:	0.06 mm
hip:	0.08 mm
ext.:	0.02 mm

Translators

length:	0.12 mm
depth:	0.02 mm

Caudicle

bulb diam.:	0.06 mm
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Translator/caudicle type: ls/o

Pollinia apex type: R

Caudicle bulb: G

Retinacula character: S

***Hoya recurvula* subsp. *bokorensis* Kloppenburg & Yap 2010**
Type clone



Pollinarium
enlarged about 165x

Pollinium
length 0.63 mm
widest 0.27 mm

Retinaculum
length 0.15 mm
shoulder 0.14 mm
waist 0.07 mm
hip 0.10 mm
extensions 0.07 mm

Translator
length 0.12 mm
wide 02 mm

Caudicle
bulb diam. .06 mm

Translator/caudicle type: ls/o

Pollinia apex type: R

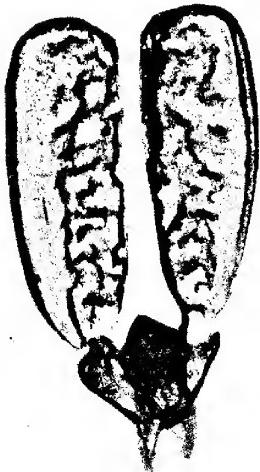
Caudicle bulb: C

Retinacula character: S

Hoya meredithii x crassicaulis

Grown and flowered in Fresno, CA.
from hybrid seedlings via MM.

Magnified approximately 65x



Pollinium

length:	0.63 mm
widest:	0.23 mm

Retinaculum

length:	0.23 mm
shoulder:	0.13 mm
waist:	0.08 mm
hip:	0.11 mm
ext.:	0.08 mm

Translators

length:	0.15 mm
depth:	0.04 mm

Caudicle

bulb. diam.: 0.07 mm

Translator/caudicle type: ls/o

Pollinia apex type: R

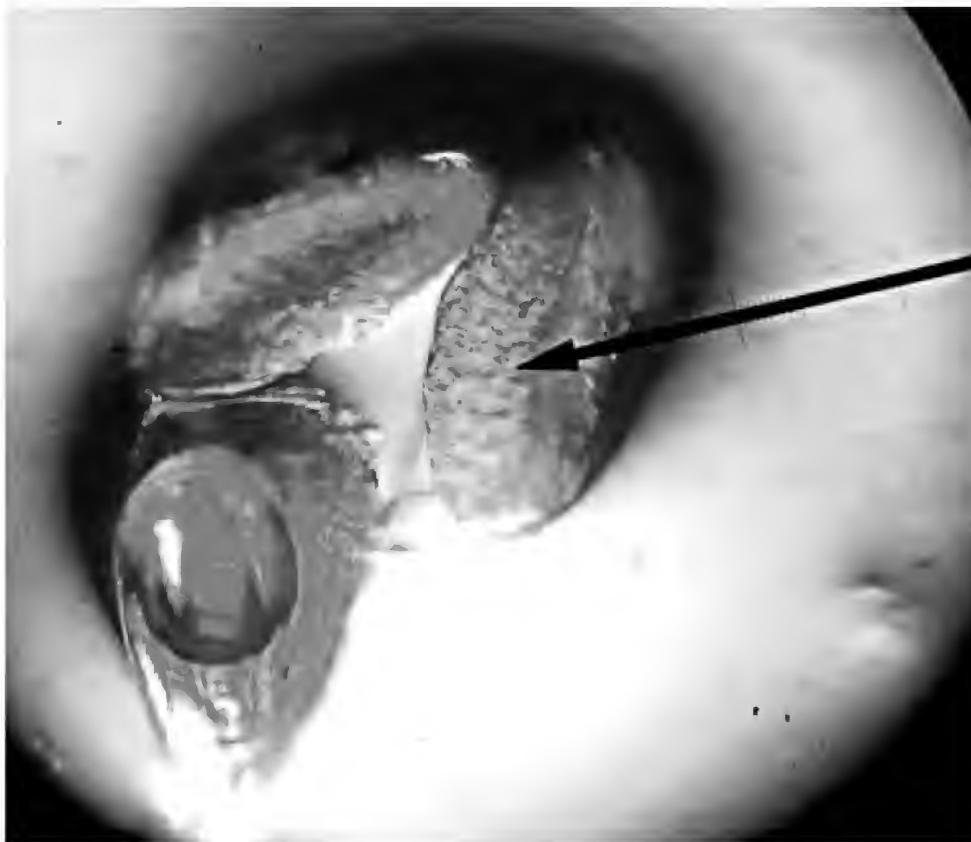
Caudicle bulb: ?

Retinacula character: S

Note retinaculum looks like *Hoya crassicaulis* Kloppenburg not *Hoya meredithii* Green

Hoya sp. CAHUP 61933

Hoya mindorensis Schlechter



Pollinaria enlarged about 165X.

Pollinium

length	0.63 mm
widest	0.29 mm
ext	0.05 mm

Retinacula

length	0.55 mm
shoulder	0.25 mm

Translator

length	0.30 mm
depth	0.03 mm

Caudicle

bulb. diam 0.07 mm

Translator/caudicle type: ls/o

Pollinia inner end type: R

Measurements difficult, pollinium of different width possibly the one on top is folded a little. Retinaculum globose and hard to discern features. The translators appear to twist as they exit the retinaculum.

Hoya sp. Sabah, Malaysia

Flower via Ann Wayman (66).



Magnified approximately 165x.

Pollinium

length:	0.63 mm
widest:	0.23 mm

Retinaculum

length:	0.21 mm
shoulder:	0.15 mm
waist:	0.10 mm
hip:	0.10 mm
ext.:	?

Translators

length:	0.18 mm
depth:	0.04 mm

Caudicle

bulb. diam.:	0.10 mm
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Translator/caudicle type: ls/o

Pollinia apex type: R

Caudicle bulb: ?

Retinacula character: S

Hoya odorata Schlechter 1906

Flower from Loher 13176 (UC) 1913



Magnified approximately
165x.

Pollinium

length: 0.62 mm
widest: 0.21 mm

Retinaculum

length: ca. 0.29 mm

Translator/caudicle type:
ls/o

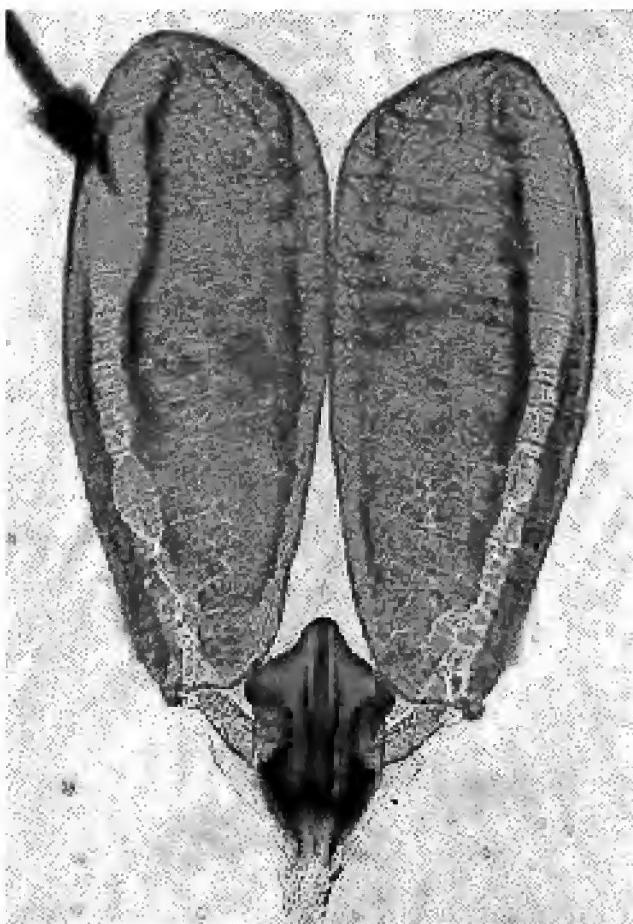
Pollinia apex type: R

Caudicle bulb: ?

Note: the other measurements are not determinable. Here the retinaculum is lying sideways so most details are not showing, nor measurable.

Hoya sp. PNG #4

From flowers collected at Edward Gilding's, Pearl City, Hawaii 9/8/00.



Pollinarium enlarged about 165x. The arrow here (upper left) is 0.1 mm. long. The pollinia here are broad and short, outer ends being broader than the inner end. The vacuole here is wider above than below, usually it is the reverse of this. The retinaculum is short and broad and well constituted, caudicles appear to spread over the translators, both are attached at the waist area of the retinaculum, actually they are attached inwardly from here in an internal cavity.

Translator/caudicle type: ls/o

Pollinia apex type: RT

Caudicle bulb: C

Retinacula character: S

Pollinarium:

Pollinia

length	0.62 mm
widest	0.22 mm near outer apex, vacuoles widest along outer edge.

Retinaculum

length	0.18 mm to end., head narrowly rounded.
shoulders	0.09 mm wide.
waist	ca. 0.4 mm wide.
hips	0.0-0.7 mm wide. Structure short and broad,
extensions.	short

Translators

length	0.08 mm
depth	ca. 0.20 mm., opaque.

Caudicles

bulb diameter 0.07 mm

Hoya obovata Decaisne 1844

Flowered in Fresno, CA. USA.



Pollinarium enlarged about 64x. Top view.

Pollinarium:

Pollinium

length	0.62 mm
widest	0.19 mm Pellucid edge extending nearly to base attachment area. Inner apex tapering inward, rounded, narrower at inner apex also rounded.

Retinaculum

length to crotch	0.22 mm
shoulders	0.16 mm wide.
waist	0.11 mm wide.
hips	0.12 mm wide.

Translator

length	Held close to the retinaculum
rounded.	0.10 mm appearing thin and somewhat

Caudicle

bulb diam.	Tip bulbous
	0.05 mm clear.

Translator/caudicle type: ls/o

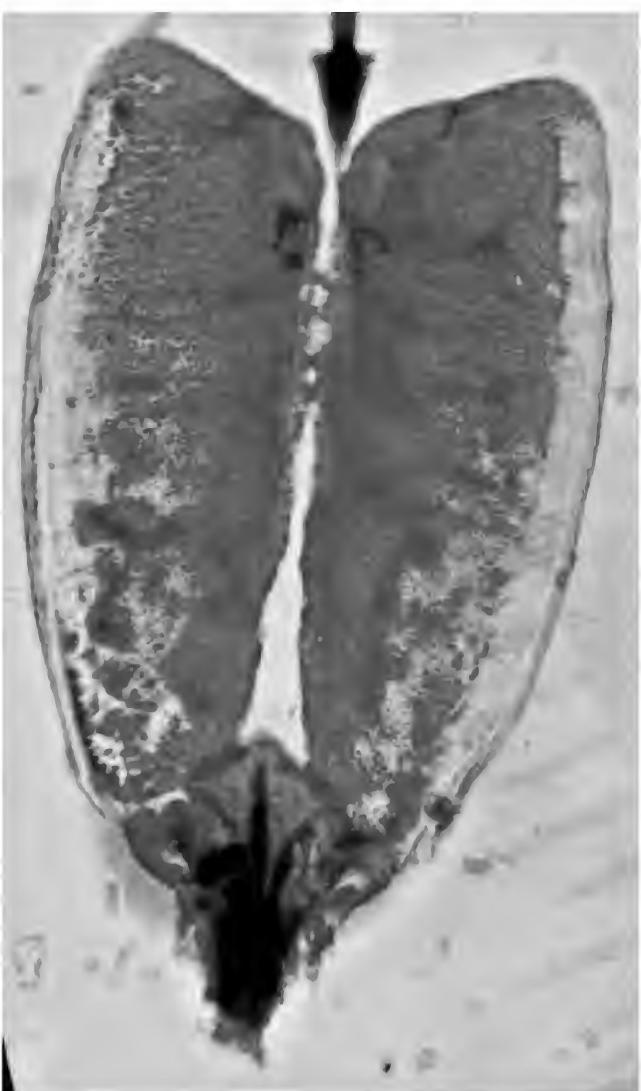
Pollinia apex type: T

Caudicle bulb: C

Retinacula character: HU

Hoya diversifolia subsp. *kimyapii* Kloppenburg

unpublished



Pollinarium enlarged
approximately 165x.

Pollinia

length 0.62 mm
widest 0.22 mm

Retinaculum

length	0.22 mm
shoulders	0.12 mm
waist	0.08 mm ca.
hip	0.10 mm
extensions, unable to measure	

Translators

length 0.09 mm
depth 0.03 mm

Caudicle bulb 0.07mm diam

Translator /caudicle type: ls/o

Pollinia inner ends: F

Outer apex of pollinia tapered inward. There seems to be some development from the shoulder area on the retinaculum, not usually seen on this structure. Dark arrow at top is 1mm long and head 1/2 mm wide

***Hoya diversifolia* ssp. *chlorina* Kloppenburg & Cajano
sp. AC #006 (unpublished)**



Pollinarium enlarged 140x.

Pollinium

length	0.7	0.61 mm
widest	0.3	0.25 mm

Retinaculum

length	0.3	0.17 mm
shoulder		0.18 mm
waist		0.10 mm
hip		0.12 mm
ext.		0.05 mm

Translator

length		0.10 mm
widest		0.02 mm

Caudicle

bulb diam.		0.05 mm
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Translator/caudicle type:
ls/o

Pollinia end type: T

Caudicle bulb: C

Retinacula character: S

Hoya subquintuplinervis Miquel 1869



Pollinium

length	0.61 mm
widest	0.22 mm

Caudicle bulb diam. 0.05 mm

Retinaculum

length	0.14 mm
shoulders	0.14 mm
waist	0.10 mm
hips	0.12 mm
extensions	0.05 mm

Translator/caudicle type: ls/o

Pollinia inner end Type: R

Translators

length	0.11 mm
width	0.03 mm

Caudicle bulb: ?

Retinacula character: R ?

Hoya monetteae Green 2004

Tumarbong Falls, Palawan, Philippines March 2000. The following pictures are from Edward Gilding, cluster of 22 flowers, pure white.



Pollinarium enlarged
about 165x.

Pollinia

length	0.60 mm.
widest	0.20 mm.

Retinaculum

length	0.14 mm.
shoulders	0.14 mm.
waist	0.07 mm.
hip	0.10 mm.
extensions	0.03 mm.

Translators

length	0.07 mm.
depth	0.03 mm.

Caudicle

bulb diam.	0.07 m.
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Translator/caudicle type: ls/o

Pollinia end type: T

Caudicle bulb: ?

Retinacula character: HU

Hoya samoensis subsp. savai'iensis Kloppenburg 2017

W 1237 as *Hoya samoensis* Seemann. 29 Nov. 1973. Savai'i, Samoa. Vine with milky juice and greenish white flowers hanging in trees in the forest at Letolo plantation at Palauli. Elevation 200m.



Pollinarium enlarged about 165x. Long pollinia and a very small retinaculum.

Pollinia

length	0.60 mm
widest	0.18 mm

Retinaculum

length	0.10 mm
shoulder	0.07 mm
waist	0.04 mm
hips	0.05mm
extensions	0.04 mm

Translators

length	0.08 mm
depth	0.03 mm

Caudicle bulb

diameter	0.06 mm
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Translator/caudicle type: ls/o

Pollinia end type: R

Caudicle bulb: C

Retinacula character: S ?

***Hoya mindorensis* subsp. *cremea* Kloppenburg & Mendoza**



Pollinarium enlarged ca.
120x.

Pollinium

length	0.60 mm
widest	0.25 mm

Retinaculum

length	0.34 mm
widest	0.25 mm
ext.	0.05 mm

Translator

length	0.24 mm
wide	0.01 mm

Caudicle Type: C
end 0.05 mm

Translator/caudicle type:
ls/r

Pollinia apex type: RT

Retinacula: LH

There are extensions to the retinaculum, they are curved under forming a rounded apex.



Pollinaria: Arrow head is 1 mm long.

Pollinia:

length	0.60 mm
widest	0.25 mm

Translators:

length	0.26 mm
widest	0.03 mm

Caudicle:

bulb diam.	0.05 mm
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Translator/caudicle type: ls/o

Pollinia inner end type: T

Retinacula type: S (shield)

***Hoya cumingiana* subsp. *flosviridia* Kloppenburg, Guevarra & Carandang
(unpublished) BG #2012-7-074**



Pollinaria enlarged 110x.

Pollinium

length	0.60 mm
widest	0.18 mm

Retinaculum

length	0.15 mm
shoulder	0.15 mm
waist	0.06 mm
hip	0.09 mm
ext.	0.04 mm

Translator

length	0.05 mm
widest	0.02 mm

Caudicle

bulb diam. 0.02mm



Translator/caudicle type: ls/o

Pollinia inner end type: F

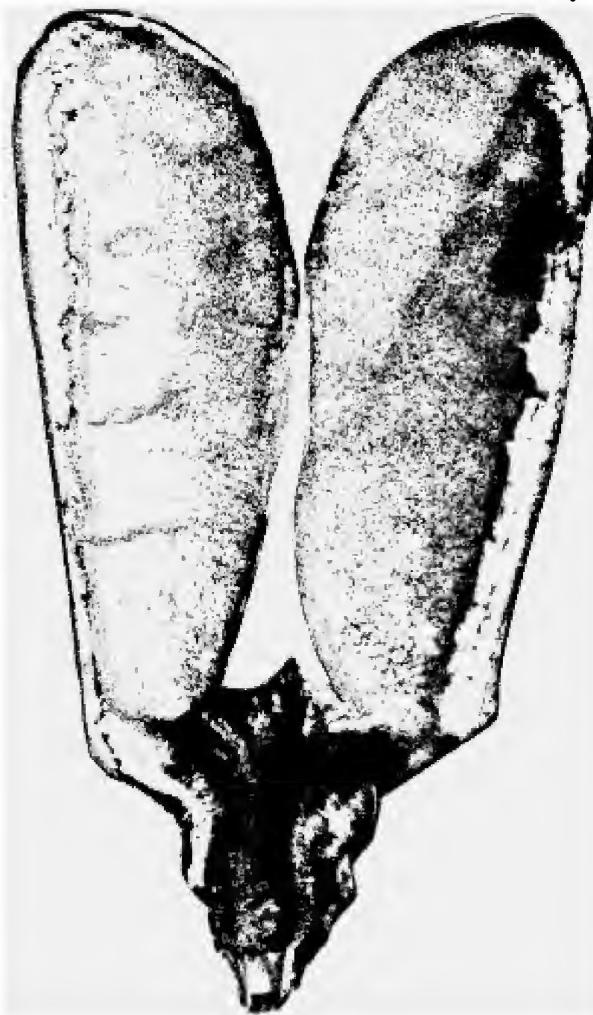
Retinacula character: S

Enlarged as above for additional structural comparisons.

***Hoya kerrii* Craib 1911**

Flower from clone of "Thailand White"
source Sakdi Sir Nsry. Bangkok, Thailand.

Magnified approximately 165x.



Pollinium

length:	0.59 mm
widest:	0.24 mm

Retinaculum

length:	0.24 mm
shoulder:	0.17 mm
waist:	0.06 mm
hip:	0.08 mm
ext.:	0.04 mm

Translators

length: ca.	0.16 mm
depth:	0.04 mm

Caudicle

bulb diam:	?
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Translator/caudicle type: ls/o

Pollinia inner end type: RT

Caudicle bulb: ?

Pollinia	<u>Thailand White</u>	<u>Marin Cactus patch</u>	<u>"Hairy"</u>
length	0.59 mm	0.58 mm	0.57 mm
widest	0.24 mm	0.27 mm	0.27 mm
Retinaculum			
length	0.26 mm	0.34 mm	0.37 mm
shoulder	0.17 mm	0.22 mm	0.19 mm
waist	0.08 mm	0.06 mm	0.08 mm
hip	0.11 mm	0.10 mm	0.17 mm
extensions	0.03 mm	0.01 mm	0.06 mm
Translators			
length	0.17 mm	0.20 mm	0.13 mm
depth	0.04 mm	0.03 mm	0.04 mm
Caudicles			
bulb diam.	0.07 mm	0.05 mm	0.08 mm

Hoya kerrii Craib 1911
Flower from clone via Marin Cactus Patch.



Magnified approximately 165x.

Pollinium

length:	0.58 mm
widest:	0.24 mm

Retinaculum

length:	0.20 mm
shoulder:	0.16 mm
waist:	0.06 mm
hip:	0.10 mm
ext.:	0.04 mm

Translators

length:	0.16 mm
depth:	0.03 mm

Caudicle

bulb diam.:	0.07 mm
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Translator/caudicle type: ls/o

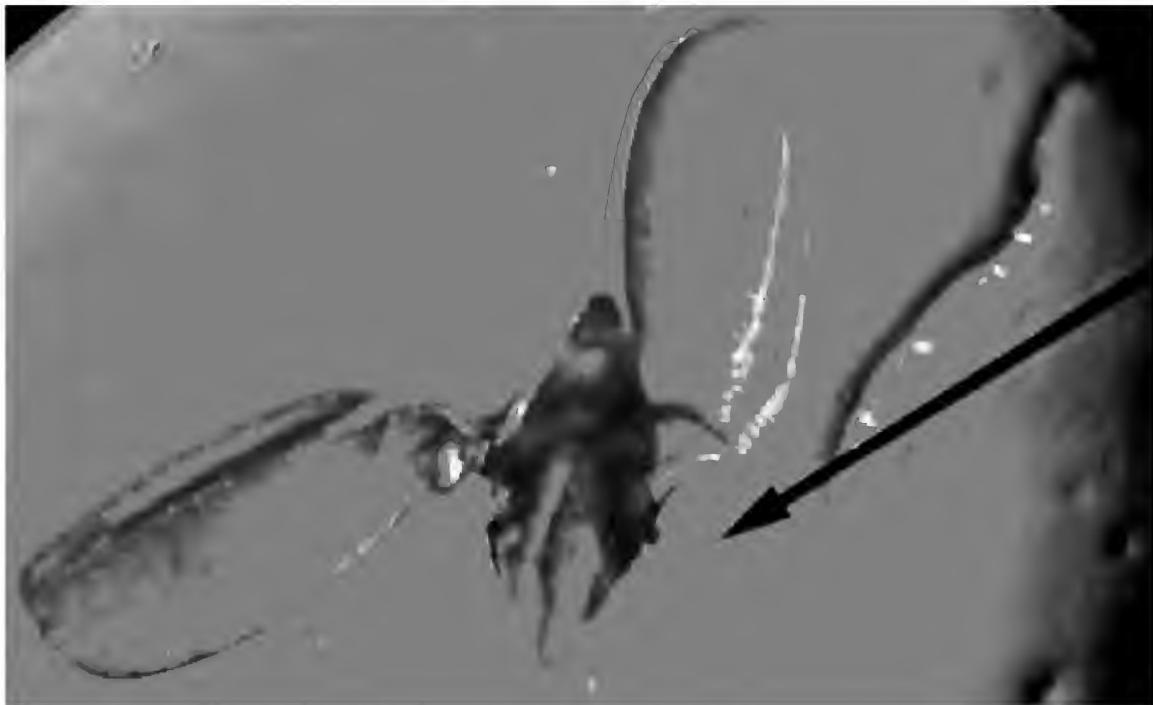
Pollinia inner end type: T

Caudicle bulb: ?

Retinacula character: HU

Hoya bandongii Kloppenburg & Ferreras 2011

Published in Fraterna 24 #4:9-13, 2011 Type clone



Pollinaria enlarged ca. 140x.

Pollinium

length	0.57 mm
widest	0.22 mm

Retinacula character: HE

Retinaculum

length	0.31 mm
shoulder	0.24 mm
waist	0.20 mm
hip	0.24 mm
ext.	0.12 mm

Translator

length	0.13 mm
depth	0.04 mm

Caudicle

bulb diam.	0.11 mm
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Translator type: ls/o

Pollinia inner end type: T

Caudicle bulb: ?

Hoya sp. Ben Vergara, #56

Flowers sent by Monina Siar, 10/25/05.



Pollinarium enlarged about 165X

Pollinium

length	0.57 mm.
widest	0.23 mm.

Retinaculum

length	0.12 mm.
shoulder	0.10 mm.
waist	0.04 mm.
hip	0.08 mm.
ext.	0.06 mm.

Translators

length	0.12 mm.
widest	0.04 mm,

Caudicle

bulb diam.	0.05 mm.
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A little sharper picture of the retinaculum. Pellucid germinal edge extends over inner edge and down outside to the base but not around the apex. Outer apices are rounded tapering inward slightly.

The translators are attached below the waist.

Mt. Matavai, Samoa Green (West)

A green flowered species 20 flowers on short curved peduncle with a triplinerved nerved foliage.



Two above photos of the Pollinarium enlarged about 165x.

Pollinium

length	0.57 mm
widest	0.21 mm

Retinaculum

length	0.20 mm
shoulders	0.12 mm
waist	0.07 mm
hips	0.09 mm
extensions	0.03 mm

Translators

length	0.13 mm
depth	0.05 mm

Caudicle

bulb diam. 0.05 mm



Translator/caudicle type: ls/o

Pollinia apex type: R

Retinacula character: HE

Hoya sp. Sulawesi med. flower
Collected 1994.



Magnified approximately 165x.

Pollinium

length:	0.57 mm
widest:	0.23 mm

Retinaculum

length:	0.20 mm
shoulder:	0.13 mm
waist:	0.08 mm
hip:	0.11 mm
ext.:	0.13 mm

Translators

length:	0.06 mm
depth:	

Caudicle

bulb. diam.: ?

Translator/caudicle type: ls/o

Pollinia apex type: R

Caudicle bulb: ?

Retinacula character: S ?

***Hoya tannaensis* T. Green & D. Kloppenburg Type clone 2011**



Pollinarium enlarged about 165x

Pollinium

length	0.57 mm
widest	0.25 mm

Retinaculum

length	0.17 mm
shoulder	0.17 mm
waist	0.10 mm
hip	0.15 mm
ext.	0.09 mm

Translator

length	0.12 mm
depth	0.03 mm

Caudicle

bulb diam.	0.06 mm
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Ratio: pol./width 2.3
Pol./ret. 2.2

Translator/caudicle type: ls/o

Pollinia apex type: T

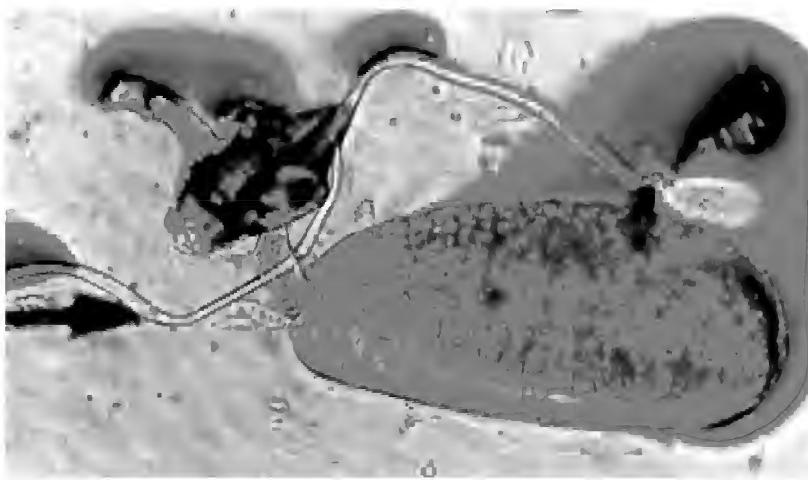
Caudicle bulb: C

Retinacula character: R

Hoya gretherii Kloppenburg 2017

3949 (UC)

Collected by D. F. Grether & W. H. Wagner, Los Negros, Pitilu Lagoon, Philippines 8
Nov. 194



Pollinarium enlarged
about 165x.

Pollinium

length	0.57 mm
Widest	0.25 mm

Retinaculum

length	0.20 mm
shoulder	0.12 mm
waist	0.06 mm
hip	0.09 mm
ext.	0.02 mm

Translators

length	0.10 mm
depth	0.02 mm

Translator/caudicle type: ls/o

Pollinia apex type: R

Caudicle bulb: G

Retinacula character: S

Hoya quisumbingii Kloppenburg 1992



Pollinarium enlarged about 165x.
(one pollinia missing).

Pollinium

length	0.56 mm.
widest	0.26 mm.

Retinaculum

length	0.27 mm.
shoulder	0.16 mm.
waist	0.05 mm.
hip	0.10 mm.
extensions	0.03 mm.

Translator

length	0.18 mm.
depth	0.04 mm.

Caudicle bulb (very large, clear)
diameter 0.18 mm.

The clear caudicle can be seen as a light area on the left upper side of the retinaculum and covering the lower portion of the pollinium, it is also squared off slightly on the left at the end of the translator.

Translator/caudicle type: ls/o
Pollinia inner end type: R

Hoya ofuensis Kloppenburg 2015



Pollinarium enlarged about 165x.
(one pollinia missing).

Pollinium

length	0.56 mm.
widest	0.26 mm.

Retinaculum

length	0.27 mm.
shoulder	0.16 mm.
waist	0.05 mm.
hip	0.10 mm.
extensions	0.03 mm.

Translator

length	0.18 mm.
depth	0.04 mm.

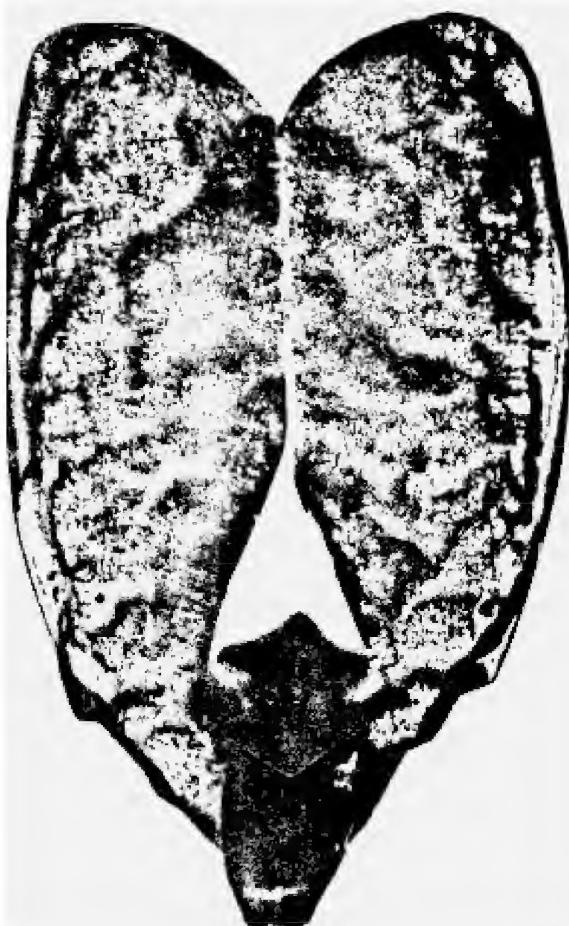
Caudicle bulb (very large, clear)
diameter 0.18 mm.

The clear caudicle can be seen as a light area on the left upper side of the retinaculum and covering the lower portion of the pollinium, it is also squared off slightly on the left at the end of the translator.

Translator/caudicle type: ls/o
Pollinia inner end type: R

Hoya diversifolia Blume 1826

Flower form clone collected in Central Malaya 1981.
Flowered in Fresno, CA.



Magnified approximately 165x.

Pollinium

length:	0.56 mm
widest:	0.23 mm

Retinaculum

length:	0.23 mm
shoulder:	0.14 mm
waist:	0.14 mm
hip:	0.12 mm
ext.:	0.03 mm

7

Translators

length:	0.13 mm
depth:	?

Caudicle

bulb diam.:	0.08 mm ?
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Translator/caudicle type: ls/o

Pollinia apex type: R

Caudicle bulb: G

Retinacula character: S

Hoya sp. Samoa double

Flower from MM, clone collected on road
to Lake Lanatoo, Western Samoa, 1988.



Magnified approximately 165x.

Pollinium

length:	0.56 mm
widest:	0.22 mm

Retinaculum

length:	0.17 mm
shoulder:	0.10 mm
waist:	?
hip:	0.08 mm
ext.:	0.03 mm

Translators

length:	0.12 mm
depth:	0.02 mm

Caudicle

bulb. diam.: 0.06 mm

Translator/caudicle type: ls/o

Pollinia apex type: F

Caudicle bulb: G

Retinacula character: S ?

Hoya sp. W 8798

Collected by Dr. Whistler on Ofu, Samoa 15 June 1992
Probably *Hoya whistleri* Kloppenburg



Pollinarium enlarged about 165x. (one pollinia missing).

Pollinium

length	0.56 mm
widest	0.26 mm

Retinaculum

length	0.27 mm
shoulder	0.16 mm
waist	0.05 mm
hip	0.10 mm
extensions	0.03 mm

Translator

length	0.18 mm
depth	0.04 mm

Caudicle bulb (very large, clear)

diameter	0.18 mm
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The clear caudicle can be seen as a light area on the left upper side of the retinaculum and covering the lower portion of the pollinium, it is also squared off slightly on the left at the end of the translator.

Translator/caudicle type: ls/o

Pollinia apex type: R

Caudicle bulb: C

Retinacula character: S

***Hoya matavenuensis* Kloppenburg 2011**

Collected by Dr. Art Whistler 9 May 1994, Savai'i, Samoa, flower white.
Elevation 650m.
9539 cf. diptera



Two views of the pollinaria the top one enlarged about 165x.

Pollinium

length	0.55 mm
widest	0.26 mm

Retinaculum

length	0.26 mm
shoulder	0.15 mm
waist	0.05 mm
hip	0.12 mm
extensions	0.04 mm

Translator

length	0.08 mm
depth	0.03 mm

Caudicle bulb

diameter ca. 0.08 mm

Caudicle is difficult to discern.



Translator/caudicle type: ls/o

Pollinia apex type: T

Caudicle bulb: G ?

Retinacula character: S



Several retinacula enlarged about 82x. Head is long with shoulders well down, waist only slightly narrower, and hips a little extended.

length	0.20 mm
shoulder	0.13 mm
waist	0.09 mm
hip	0.10 mm
extensions	0.08 mm



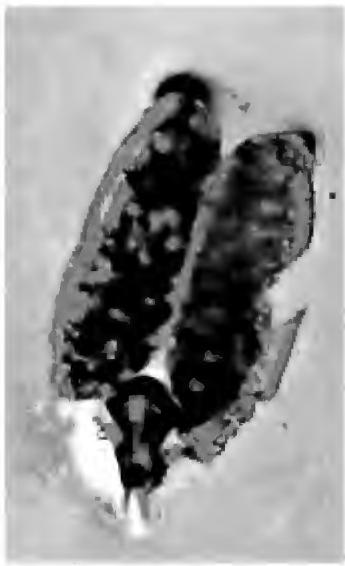
Pollinia here still in the anther sack enlarged about 82x. The length is ca. 0.55 mm long and 0.20 mm widest.

Translator/caudicle type: ls/o ?

Pollinia inner end: R

Retinacula: LH

Hoya smithii Kloppenburg 2010



Pollinaria enlarged about 83x.

Pollinia

length	0.55 mm
widest	0.20 mm

Retinacula

length	0.20 mm to the extensions
shoulder	0.19 mm
waist	0.06 mm
hip	0.10 mm
extensions	0.05 mm

Translator

length	0.07 mm very narrow
depth	0.015 mm

Caudicle bulb diameter 0.06 mm ca.

Translator/caudicle type: ls/o

Pollinia apex type: RT

Caudicle bulb: C ?

Retinacula character: R

Hoya whistleri subsp. faleuluensis Kloppenburg 2017

W 7989

Collected by Dr. Whistler on Ta'u, Samoa 9 Jan. 1991 elev. 350 m.



Pollinarium enlarged about 165x. Retinaculum here skewed to one side.

Pollinium

length	0.55 mm
widest	0.21 mm

8Retinaculum

length	0.15 mm
shoulders	0.12 mm
waist	0.08 mm
hip	0.10 mm
extensions	0.05 mm

Translator

length	0.13 mm
depth	0.02 mm

Caudicle

bulb diam.	0.06 mm
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Translator/caudicle type: ls/o

Pollinia apex type: T

Caudicle bulb: C

Retinacula character: HU

Retinaculum enlarged about 165x. Note the horns at the shoulder extending backward from this region. The translators are close to the retinaculum sides here and the caudicle is stretched out above.

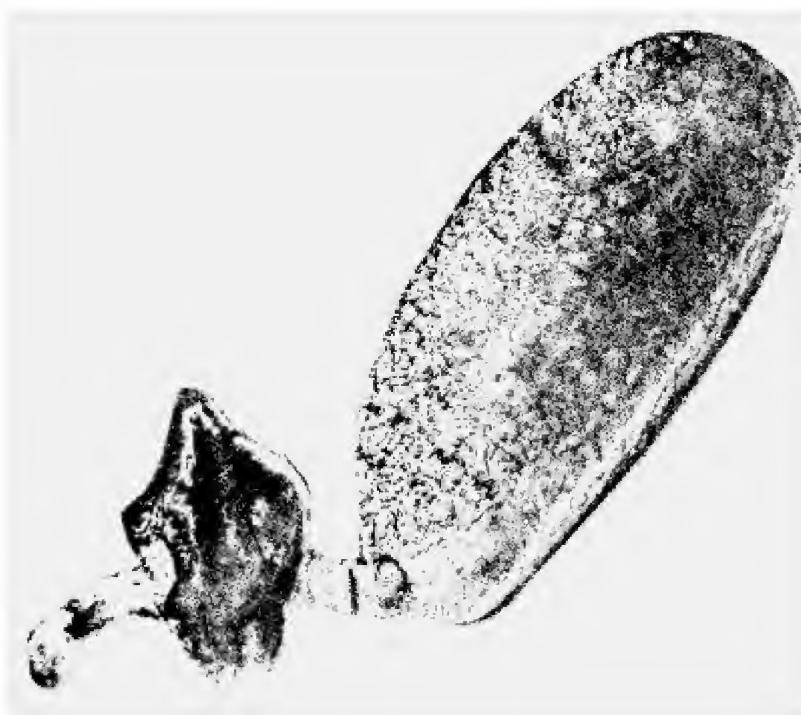


Hoya gretheri Kloppenburg 2017

Hoya sp. Grether & Wagner Jr. UC 3949

Collected at Pitilu Lagoon, Los Negros, Philippines 1945.

Magnified approximately 165x.



Pollinium

length: 0.55 mm
widest: 0.25 mm

Retinaculum

length 0.25 mm
shoulder 0.16 mm
waist 0.10 mm
hip 0.12 mm
ext. 0.02 mm

Translators

length 0.16 mm
depth 0.03 mm

Caudicle

bulb diam. 0.03 mm

Translator/caudicle type:
ls/o

Pollinia apex type: R

Caudicle bulb: ?

Retinacula character: S ?

Hoya sp. Matoata Cream 2003

SW end of Tutuila, American Samoa 50m.

In bloom early October 2003 vine just above roadside in bloom with 26 large cream colored flowers on long rachis, bracteate.



Pollinarium enlarged about 165x, with the binocular microscope. Note the yellow caudicles.

Pollinia

length	0.55 mm
widest	0.22 mm

Retinaculum

length	0.15 mm
shoulder	0.12 mm
waist	0.08 mm
hip	0.10 mm
extension	0.09 mm

Translators

length	0.14 mm
widest	0.05 mm

Caudicle

bulb diameter 0.07 mm

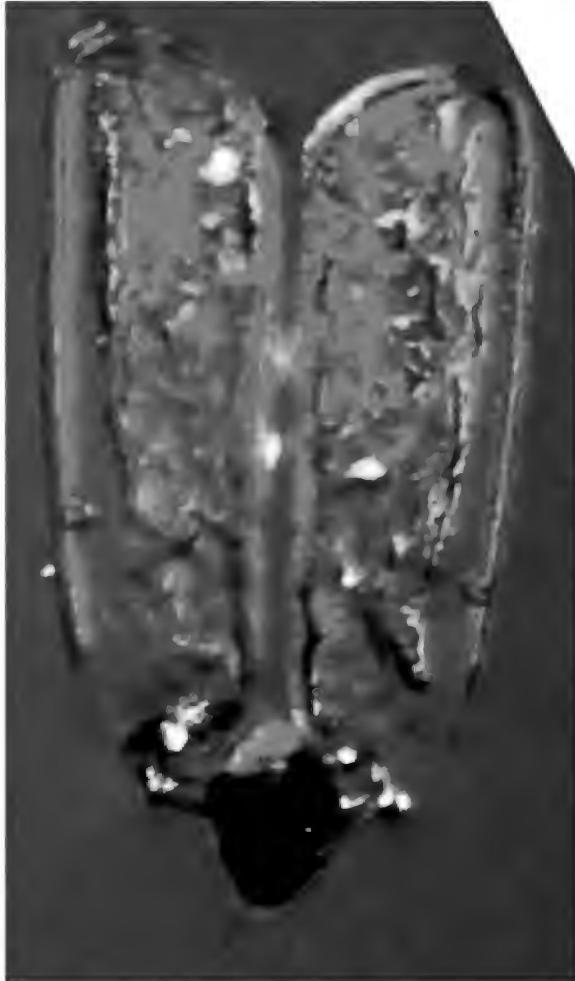
Translator/caudicle type: ls/o

Pollinia apex type: R

Caudicle bulb: G

Retinacula character: S

Hoya sp. flowered by Astrid Boström via Torill Nyuus, Sweden
Specimen collected in Buluson, Philippines



Pollinaria enlarged about 165x.
The pollinia are long and relatively narrow with rounder inner apices. The pellucid edge extends over this edge. The retinaculum is minute with short translators and small caudicles. The extensions are flared and not well developed.

Pollinium

length	0.55 mm
widest	0.19 mm

Retinaculum

length	0.15 mm
shoulders	0.10 mm
waist	0.05 mm
hip	0.07 mm
ext.	0.04 mm

Translators

length	0.09 mm
width	0.02 mm

Caudicle bulb diam. 0.05 mm

Translator/caudicle type: ls/o

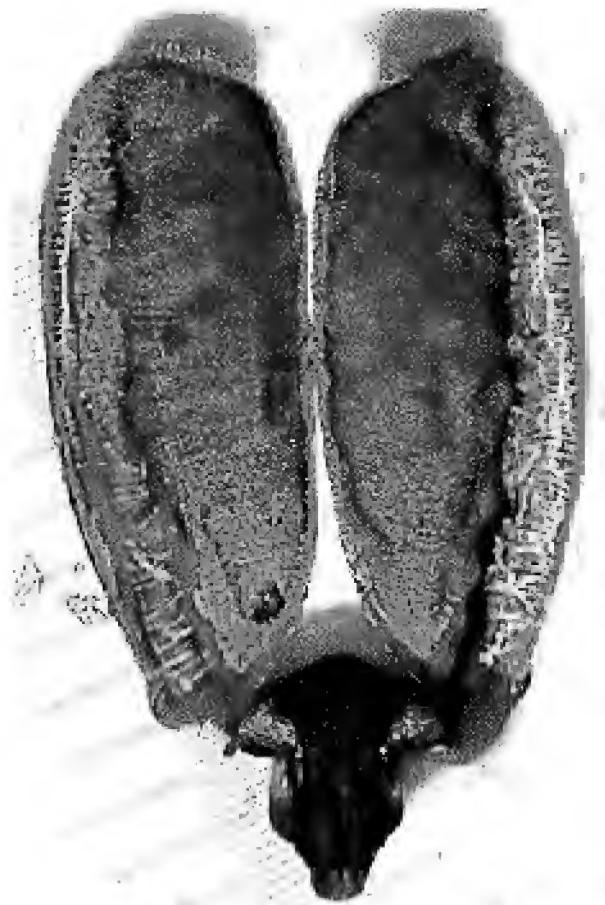
Pollinia apex type: R

Caudicle bulb: C

Retinacula character: S

Hoya longifolia Wallich ex Wight 1834

Flowered at Fresno, CA.



Pollinarium enlarged about 165x. I believe each species pollinarium is distinct. There are so many features in this complex structure with which to delineate differences. Here among other characters is the translators attached way up under the head of the retinacula. The pollinia are broad and relatively short with wide vacuoles in from the narrow pellucid edge. both apices of the pollinia are rounded the outer ones more so, tapering inward slightly. The retinaculum has a broad head, narrow double waist and medium broad hip area. The translators appear to be rounded and nearly straight, the caudicles are very small.

Translator/caudicle type: ls/o

Pollinia apex type: R

Retinacula character: S

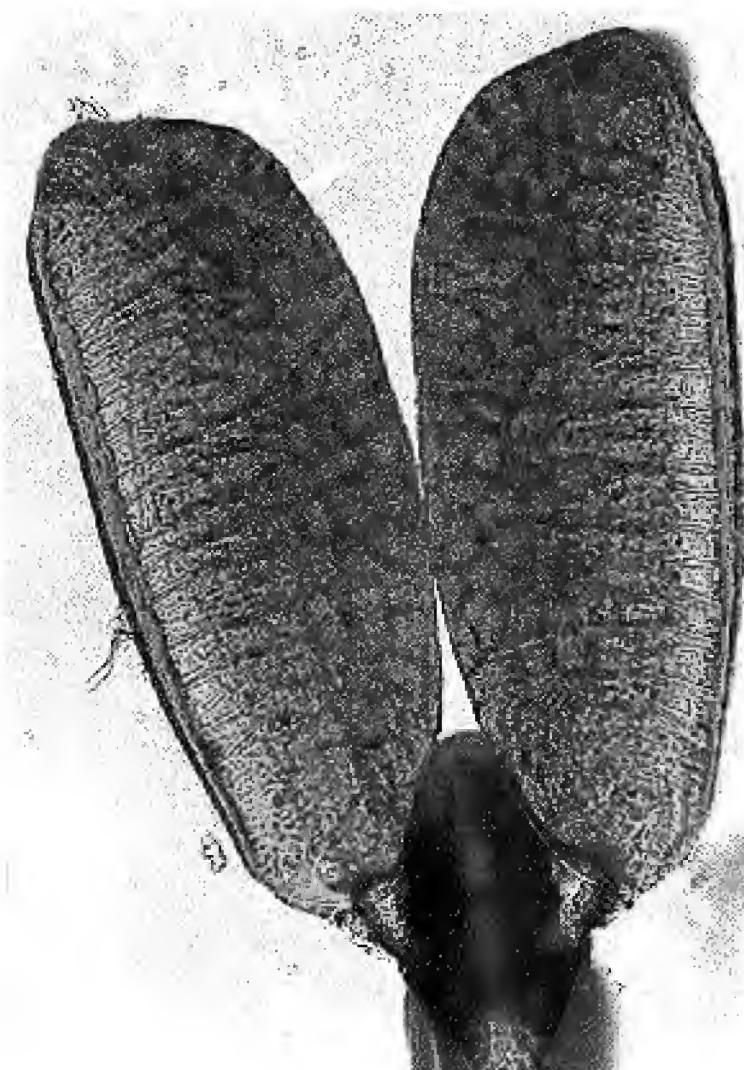
Pollinia	
length	0.55 mm
widest	0.26 mm

Retinaculum	
length	0.23 mm
shoulder	0.14 mm
waist	0.07 mm
hip	0.11 mm
extensions	0.02 mm

Translators	
length	0.06 mm
depth	0.01 mm

Caudicle	
bulb diam.	?

***Hoya golamcoiana* Kloppenburg 1991**
Flower from Type CAHUP 41930
shown here again as it is close to the cumingiana species.



Magnified approximately
165x.

Pollinium

length: 0.55 mm
widest: 0.20 mm

Retinaculum

length: 0.15 mm
shoulder: 0.13 mm
waist: 0.06 mm
hip: 0.09 mm
ext.: 0.07 mm

Translators

length: 0.10 mm
depth: 0.02 mm

Caudicle

bulb diam.: 0.06 mm

Type: G

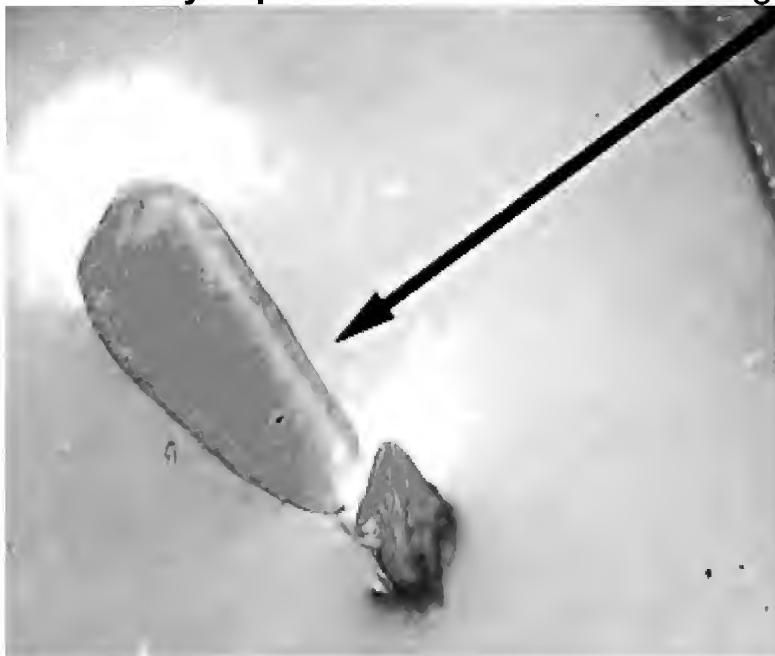
Translator/caudicle type:
ls/o

Pollinia apex type: R

Caudicle bulb: ?

Retinacula character: LS

Hoya sp. CAHUP 18680 as H. cumingiana Decaisne



Pollinaria enlarged
about 165x.

Pollinium

length	0.55 mm
widest	0.23 mm

Retinaculum

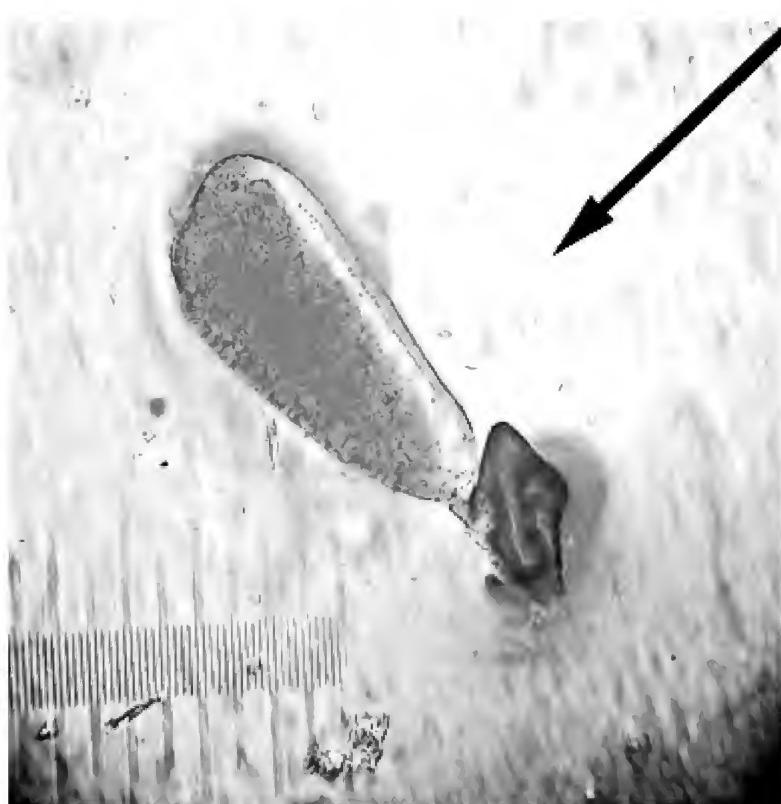
length	0.22 mm
shoulder	0.14 mm
waist	0.08 mm
hip	0.10 mm
ext.	0.03 mm

Translators

length	0.07 mm
depth	0.02 mm

Caudicle

bulb diam. 0.07 mm



A second photo of the pollinaria. As above the pollinium has turned on the axis and the pellucid edge in inward. Outer apex is widely rounded, translators are short and narrow, caudicle bulb not well defined. Here the retinacular measurements were slightly smaller.

Leaves look like *H. densifolia*, the Pollinarium does not fit either species, as it is the pollinia are

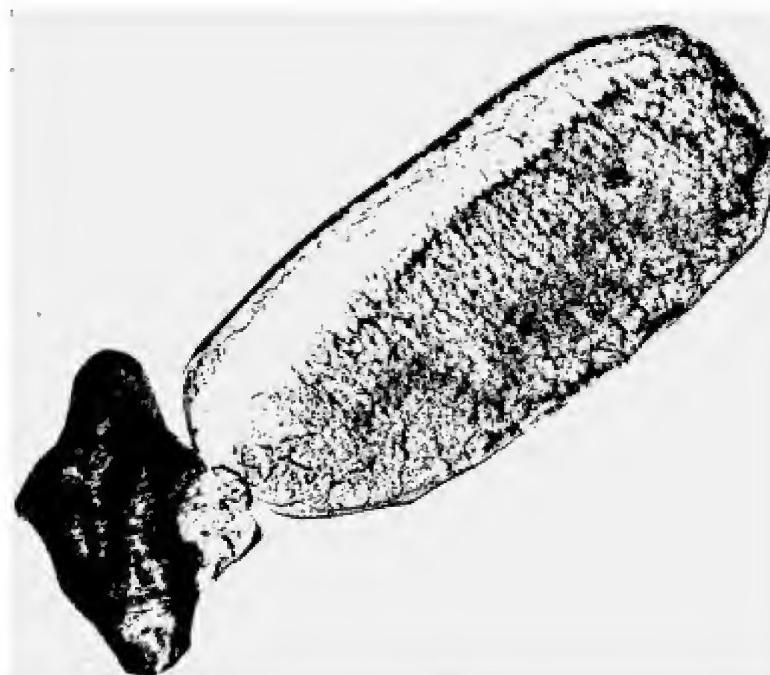
much shorter.

Translator/caudicle type: ls/o

Pollinia apex type: R
Caudicle bulb: C

Retinacula character: S

Hoya sp. Ramos & Edano (UC) 49328
1927 at Mati, Davao, Mindanao.



Magnified approximately 165x.

Note: pollinium twisted inward on its axis

Pollinium

length: 0.55 mm
widest: 0.24 mm

Retinaculum

length: 0.23 mm
shoulder: 0.17 mm
waist: 0.08 mm
hip: 0.12 mm
ext.: 0.04 mm

Translators

length: 0.07 mm
depth: 0.02 mm

Caudicle

bulb. diam.: 0.05 mm

Translator/caudicle type: ls/o

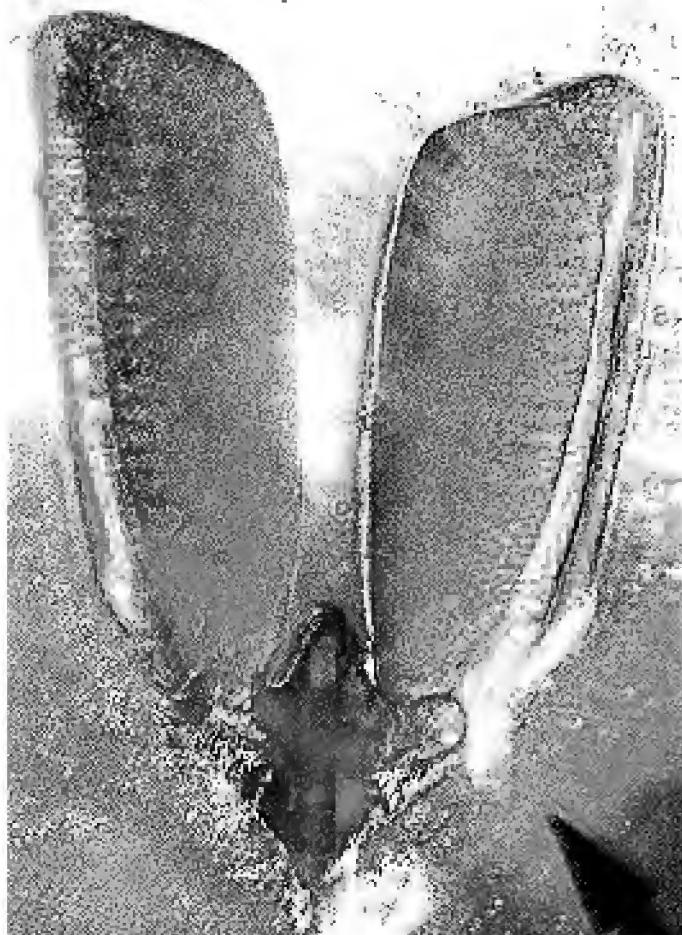
Retinacula character: S

Pollinia apex type: R

Caudicle bulb: ?

***Hoya cominsii* Hemsley 1890**

Flower from clone IML 457 van Ann Wayman



Pollinarium of DAV 819

enlarged approx. 165x. The Pollinaria of IML 457 is almost identical. At this time I do not see that these are different species. The retinaculum (not showing here) has a definite groove down the top side, the inner apex is fairly narrow and pointed and the shoulders are prominent , at one level of focus reveal the inward pointing end, a sharp waist, rounded hips (all visible here). The translators are short supporting bulbous clear caudicles. Pollinia are long broad with a pellucid sterile edge extending only part way from the inner apex toward the caudicle. The adjacent vacuole is especially wide in this species.

Translator/caudicle type: ls/o

Pollinia apex type: T

Caudicle bulb: C

Retinacula character: HU

Pollinium

length	0.54 mm
widest	0.19 mm

Retinaculum

length	0.13 mm
shoulder	0.12 mm
waist	0.07 mm
hip	0.08 mm
extensions	0.03 mm

Translators

length	0.10 mm
depth	0.02 mm

Caudicle

bulb diam. 0.14 mm

***Hoya kerrii* Craib 1911**

Flower from clone "hairy kerrii"



Pollinarium enlarged about 165x. The head of the retinaculum is actually apiculate, or with a slight protrusion (not well defined here) with broad shoulder area and the internal cavities to which the translators and caudicles are attached are plainly visible. The pollinia are broad with rounded apex. The sterile edge is almost straight not curving around the end adjacent to the retinaculum. The caudicle is clear bulbous almost enveloping the translators.

Pollinium

length	0.54 mm
widest	0.23 mm

Retinaculum

length	0.25 mm
--------	---------

shoulder	0.22 mm
----------	---------

waist	0.09 mm
-------	---------

hip	0.14 mm
-----	---------

Translators

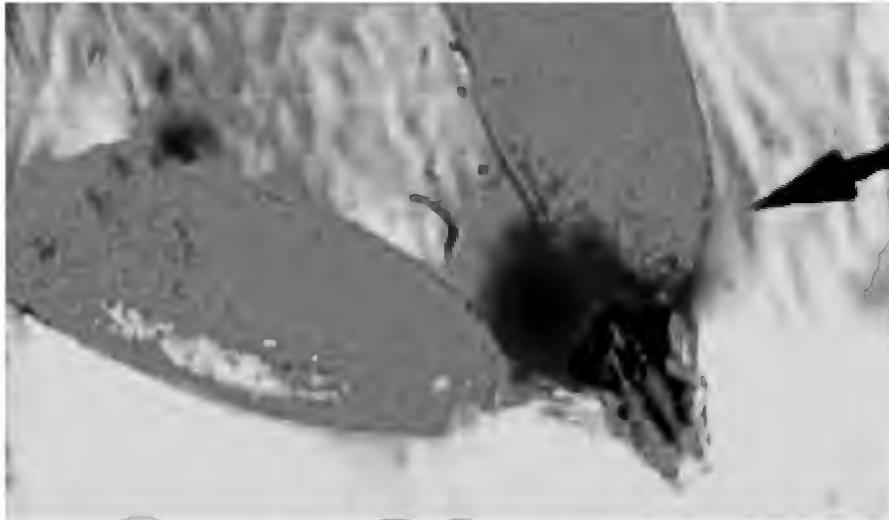
length	0.16 mm
depth	0.04 mm

Caudicle

bulb diam.	0.08 mm
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Translator/caudicle type: ls/o**Pollinia apex type:** R**Caudicle bulb:** G**Retinacula character:** S

Hoya corollamarginata subsp. upoluensis Kloppenburg 2017
ISSN 2329-7336



Pollinarium above enlarged about 148x.
to show the retinaculum better then the
photo below.

Pollinium

length	0.54 mm
widest	0.20 mm

Retinaculum

length	0.15 mm
shoulders	0.11 mm
waist	0.07 mm
hip	0.09 mm
extensions	0.04 mm

Caudicle

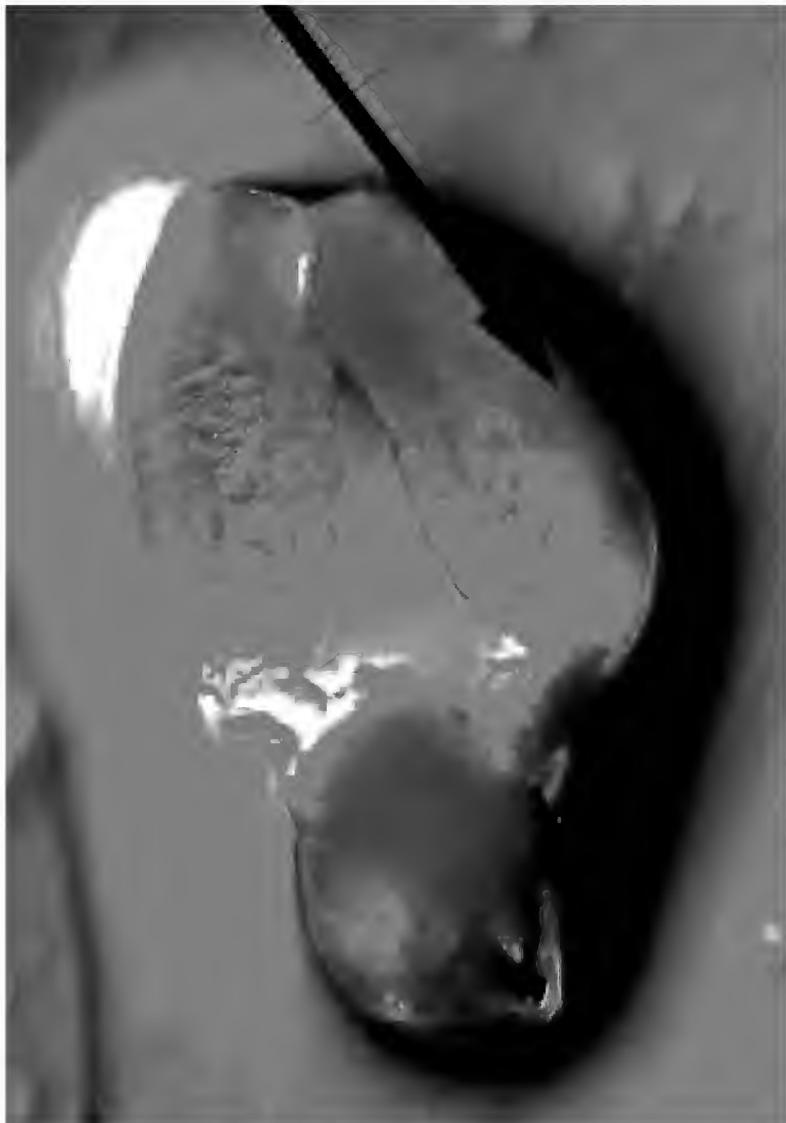
bulb diameter 0.05 mm

Retinacula type: HU

Pollinia Inner ends: T

Translator/caudicle type: ls/o

***Hoya mindorensis* subsp. *nagcarlanensis* Kloppenburg, Mendoza**



Pollinaria enlarged ca.
120x

Pollinium

length	0.54 mm
widest	0.22 mm

Retinaculum

length	0.30 mm
widest	0.21 mm
ext.	0.05 mm

Translator

length	0.15 mm
widest	0.04 mm

Caudicle Type: G
bulb diam. 0.07 mm

Translator/caudicle
type: ls/r

Pollinia end type: R

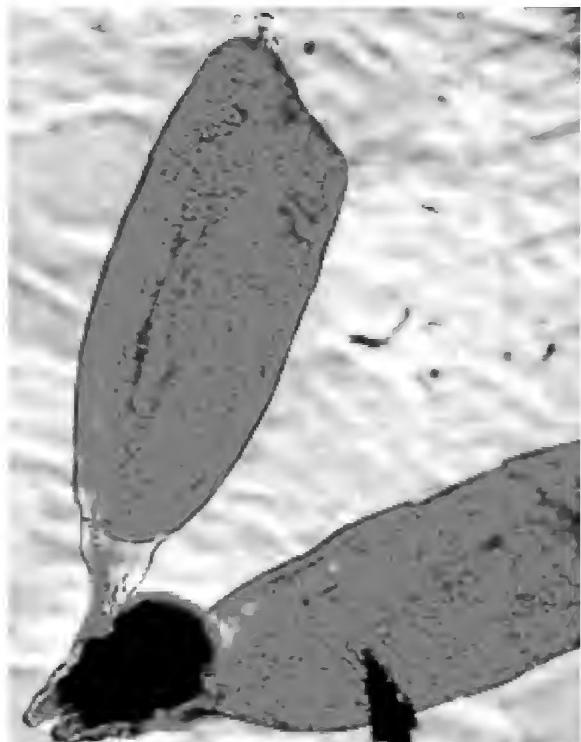
Retinacula: LN

Hoya betchei (Schltr.) Whistler 1978

Collected by Dr. Whistler 7 Jan. 1976, Upolu, Samoa elev. 400m.

W 3243 *Hoya betchei* I believe this is correct.

Pollinaria above enlarged about 148X. to show the retinaculum better then the photo below.



Pollinium

length	0.54 mm
widest	0.20 mm

Retinaculum

length	0.15 mm
shoulders	0.11 mm
waist	0.07 mm
hip	0.09 mm
extensions	0.04 mm

Caudicle

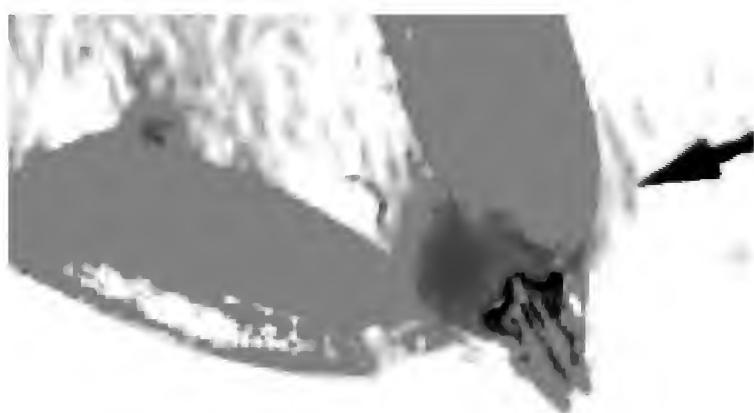
bulb diameter 0.05 mm

Translator/caudicle type: ls/o

Pollinia apex type: F

Caudicle bulb: C

Retinacula character: S



Hoya savaiensis Kloppenburg & Whistler Type clone 2009
Collected by Dr. Art Whistler on Savai'i 30 April 1994 flowers white, elev. 50 m.



Pollinia

length	0.54 mm
widest	0.21 mm

Retinaculum

length	0.18 mm
shoulders	0.12 mm
waist	0.06 mm
hip	0.10 mm
extensions	0.03 mm

Translator/caudicle type: ls/o

Pollinia end type: RT

Caudicle bulb: ?

Retinacula character: S



A better view of the retinaculum enlarged as above. Translators are short and wider near the retinaculum only part of the clear caudicle on top is visible here, may have stayed on the pollinium end. Same retinaculum will yield some structural differences due to depth of focus as this is a 3 dimensional object. Note here the shoulders seem to turn up and as they go back at a lower level, they turn down. Pollinia has a clear pellucid edge from top to near the inner end and accompanied by the void area with no pollen structures

present. Some pollen grains have germinated.

W 9456 Savai'i



Pollinia

length	0.54 mm
widest	0.21 mm

Retinaculum

length	0.18 mm
shoulders	0.12 mm
waist	0.06 mm
hip	0.10 mm
extensions	0.03 mm



present. Some pollen grains have germinated.

A better view of the retinaculum enlarged as above. Translators are short and wider near the retinaculum only part of the clear caudicle on top is visible here, may have stayed on the pollinium end. Same retinaculum will yield some structural differences due to depth of focus as this is a 3 dimensional object. Note here the shoulders seem to turn up and as they go back at a lower level, they turn down. Pollinia has a clear pellucid edge from top to near the inner end and accompanied by the void area with no pollen structures

Hoya sp. PNH 7889

Collected by McClure 24 Oct. 1921 near Taoi Tseng, Hainan



Pollinaria enlarged about 165x. and a retinaculum in a little better detail

Pollinium

length	0.53 mm
widest	0.20 mm

Retinaculum

length	0.27 mm
shoulder	0.10 mm
waist	0.05 mm
hip	0.06 mm
ext.	0.03 mm.

Translators

length ca.	0.10 mm
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**Retinacula
character: S**

**Pollinia inner end
type: T**

Translator/caudicle:
ls/o ?

depth 0.03 mm

Caudicle bulb diam. 0.05 mm ca.

Hoya hainanensis Merrill 1929

Pollinarium from Type, McClure 9757.



Magnified about 165x.

Pollinium

length:	0.53 mm
widest:	0.21 mm

Retinaculum

length:	0.26 mm
shoulder:	0.14 mm
waist:	0.09 mm
hip:	0.12 mm
ext.:	0.02 mm

Translator/caudicle type: ls/o

Pollinia apex type: R

Caudicle bulb: ?

Retinacula character: HE

Translators

length:	0.11 mm
depth:	0.03 mm

Caudicle

bulb diam.: 0.08 mm

Hoya pauciflora Wight 1848

Flower from Jerry Williams, Vista, CA.



Magnified approximately
165x.

Pollinium

length: 0.53 mm
widest: 0.26 mm

Retinaculum

length: 0.21 mm
shoulder: 0.26 mm
waist: 0.10 mm
hip: 0.11 mm
ext.: 0.04 mm

Translators

length: 0.12 mm
depth: 0.04 mm

Caudicle

bulb diam.: 0.05 mm

Translator/caudicle type: ls/o

Pollinia apex type: R

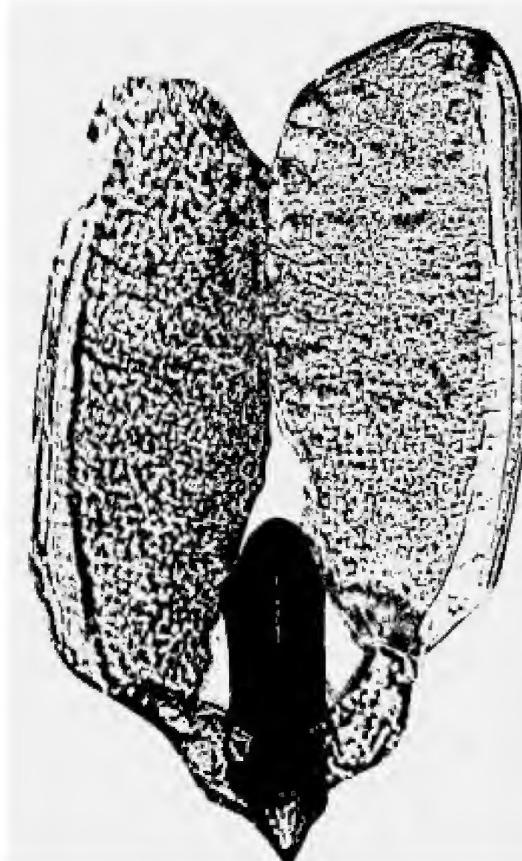
Caudicle bulb: ?

Retinacula character: S

Hoya sp. Here (UC) 1013 Colon

Labeled *H. quinquinervia*.

7



Magnified approximately 165x.

Pollinium

length:	0.52 mm
widest:	0.22 mm

Retinaculum

length:	0.24 mm
shoulder:	0.09 mm
waist:	0.07 mm
hip:	0.09 mm
ext.:	0.04 mm

Translators

length:	0.12 mm
depth:	0.04 mm

Caudicle

bulb. diam.:	0.08 mm
Double hip (upper)	0.10 mm

Translator/caudicle type: d/o

Pollinia apex type: R

Caudicle bulb: G

Retinacula character: E

Note: I believe this clone is *Hoya cardiophylla* Merrill based on a comparison of the pollinaria.

Hoya diversifolia subspecies elnidicus Kloppenburg 1991

Flower from Type clone CAHUP 41931, El Nido, Palawan, Philippines.

Magnified approximately 165x.



Pollinium

length:	0.52 mm
widest:	0.20 mm

Retinaculum

length:	0.18 mm
shoulder:	0.12 mm
waist:	0.07 mm
hip:	0.09 mm
ext.:	0.03 mm

Translators

length: ca.	0.10 mm
depth:	0.02 mm

Caudicle

bulb diam.:	0.05 mm
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Translator/caudicle type: ls/o

Pollinia apex type: T

Caudicle bulb: ?

Retinacula character: S

Comments: this species has been incorrectly placed into synonym with *H. diversifolia* Blume. Compare to see the pollinaria differences.

Hoya marginata Schlechter 1905

This species I collected at the Teneru Falls with Geoff Dennis. I am not certain the following flower study supplied by Ann Wayman is the same species or clone. Film roll 254, 8/20/00.



View of a pollinarium. The scale (arrow) is a little blurred but I think about correct in my measurements:

Pollinium

length	0.52 mm
widest	0.20 mm

Retinaculum

length	0.17 mm
shoulder	0.12 mm
waist	0.04 mm
hip	0.09 mm
ext.	0.07 mm

Translator

length	0.12 mm
widest	0.06 mm

Caudicle

bulb diam.	0.07 mm
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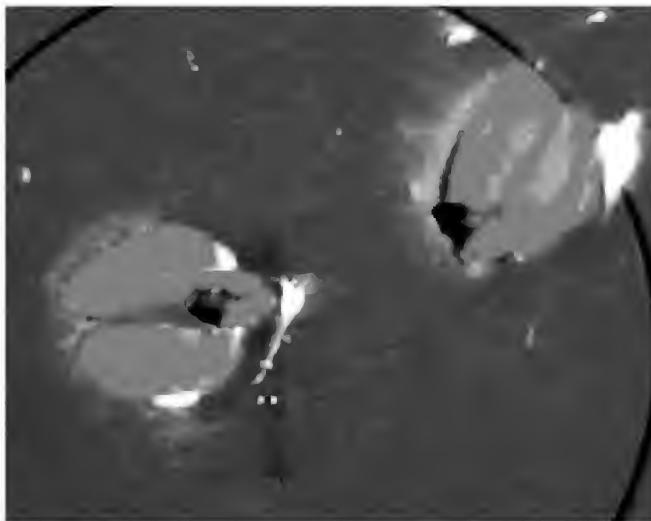
Translator/caudicle type: ls/o

Pollinia apex type: RT

Caudicle bulb: C

Retinacula character: S

Hoya telosmoides Omlar 1996



Two pollinarium, enlargement undetermined., typical of the Genus Hoya. Relatively small, retinaculum somewhat ovate, with short translators.

Translator/caudicle type: ls/o

Pollinia apex type: R

Caudicle bulb: C

Retinacula character: S

The reticule here is a little fuzzy so precise measurements are not possible. As best as I can manage are listed here

Pollinium

length	0.52 mm
widest	0.22 mm

Retinacula

length	0.23 mm
shoulder	0.14 mm
waist	none
hip	none
ext.	0.02 mm

Translators

length	0.12 mm
widest	0.03 mm



Caudicle

bulb diam. 0.06 mm

Hoya uncinata Teijsmann & Binnendijk 1863

Synonym *Hoya padangensis* Schlechter.



overall view of the retinacula structure as well as the pollinia. In the previous picture the rounded sides are the result of what I term the shoulder of the retinaculum protruding forward from the main body of the structure. Here you see the structure with a rounded head, protruding shoulders and the lighter cavities in the sides where the translators and caudicle inner ends are attached. There is very little narrowing of the waist but the divided outer apex is well developed.

I wanted to show at least photomicrographs here to illustrate the fact that even small objects have depth and because they do focusing at varying depths reveal different structural features. One photo will not tell the whole story. Here the object is enlarged about 165x and the focus is to the top of the retinaculum and reveals a point on the head of the retinaculum, with broad rounded areas to the sides. It is well to note that the pollinia are thick and short with a thick and relatively short pellucid edge and well developed pentagonal walled pollen grains. Now look at the next photomicrograph and see the differences a different focal length difference reveals. I usually portray the pollinarium so that it shows the translator attachments and a good



Pollinarium:

Pollinia

length	0.52 mm
widest	0.27 mm

Retinaculum with rounded head broad forward protruding shoulders, and short hips, short waist; with divided (legs) horizontally lined.

length	0.45 mm including divided legs
shoulders	0.28 mm
waist	0.16 mm
legs	0.16 mm long

Translator

length	0.19 mm narrow in thickness.
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Caudicle

bulb diameter	0.05 mm
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Translator/caudicle type: ls/o

Pollinia apex type: R

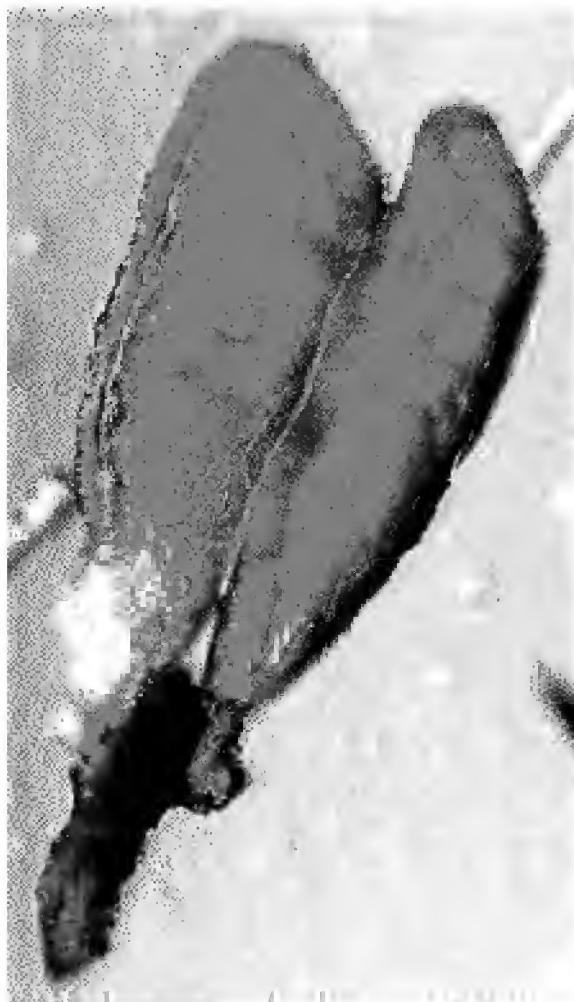
Caudicle bulb: C ?

Retinacula character: S

One final photo enlarged about 165x in the hope of showing some detail of the translator which here on thin, cupped on the upper side supporting a thin caudicle to which the pollinium sticks. Here it appears that the translator extends on down the side of the retinaculum whereas the caudicle appears to enter the cavity in the retinaculum side. It might be well to note the horizontal striations on the retinaculum surface. This pollinia is similar to that found in *H. bordenii* Schlechter, *H. mindorensis* Schlechter and *H. solaniflora* Schlechter.

Hoya vitellinoides Bakhuizen Brink f. 1950

Pollinarium enlarged about 165x. Here at least 40 years old from the type sheet. The retinacula is almost identical to that of *H. meredithii* Green. The retinacula being long had a tendency to turn on its axis so I could get only 2 to stay oriented correctly. The pollinia are notorious also for turning, leaving the pellucid edge facing the center rather than as in the natural state.



Pollinarium enlarged about 165x.

Here the retinaculum has turned on its axis so not in its natural configuration and also the left pollinium has turned so the pellucid edge is internal. The apical slope of the pollinia conforms to that of *Hoya meredithii* Green but appear to be a little more broad.

Pollinarium:

Pollinia

length	0.52 mm pellucid edge rather thick
widest	0.19 mm

Retinaculum

length 0.22 mm
shoulder ca. 0.04 mm narrow and long with groove down entire length,
about. wide, edges appear to be rough in places.

Translator,

length	0.14 mm
widest	0.10 mm

Caudicle ca. 0.09 mm in diameter.

Translator/caudicle type: ls/o

Pollinia apex type: F

Caudicle bulb: G

Retinacula character: E

Discussion: I would say this species and *Hoya meredithii* Green are very closely related but there are several major differences. According to the description this species has an almost flat corolla, yellow dry 0.8 cm in diameter. *H. meredithii* has reflexed corolla lobes also yellow but 1.4 cm in diameter. The type description says translators almost twice longer (longer than what, I do not understand). To add to the confusion look at my Passport to IPPS 7020.

Hoya fitoensis Kloppenburg 2015

Labeled *H. diptera* but not that sp. Collected by Dr. Whistler 14 May 1996, Upolu, Samoa. Elevation 1060 m. White or pink flowers. sp. W 10007



Pollinaria enlarged about 165x.

Pollinia

length	0.52 mm
depth	0.22 mm

Retinaculum

length	0.15 mm
shoulder	0.10 mm
waist	0.05 mm
hips	0.10 mm
extensions	0.03 mm

Translator

length	0.11 mm
depth	ca 0.02 -0.-05 mm

Caudicle

bulb diameter 0.05 mm

Translator/caudicle type: ls/o

Pollinia apex type: T

Caudicle bulb: C ?

Retinacula character: HU

Retinaculum below not as enlarged.



Hoya sp. W 1106

Labeled *H. filiformis*. Collected by Dr. Art Whistler Upolu, Samoa elev. 600m.
Flowers white



Pollinium enlarged about 165x. Pollinia and Retinaculum could not be removed attached. Lower right edge folded in slightly.

Pollinium

length	0.52 mm
widest	0.21 mm

Retinaculum

length	0.18 mm
shoulder	0.09 mm
waist	0.05 mm
hip	0.08 mm
extensions	0.03 mm

Translator

length	0.10 mm
depth	0.04 mm

Caudicle

bulb diameter ca. 0.05 mm



Retinaculum laying a little sideways enlarged about 165x. translator close to side on left and skewed down on right side, caudicle enveloping apical end.

Translator/caudicle type: ls/o

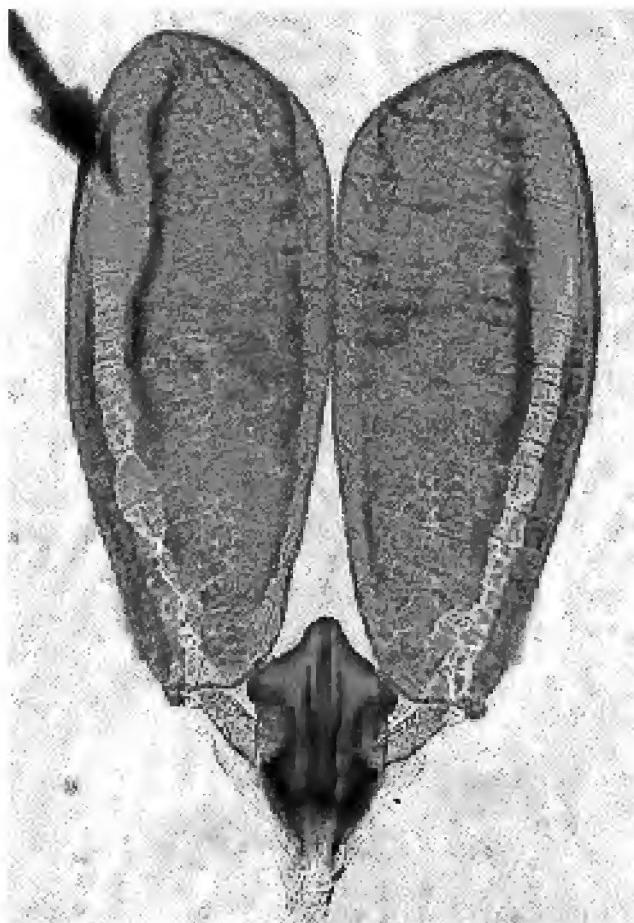
Pollinia apex type: R

Caudicle bulb: ?

Retinacula character: S

***Hoya lamingtoniae* Bailey 1898**

Hoya sp. PNG #4



Pollinaria:

Pollinia	0.52 mm long, 0.22 mm widest near outer apex, vacuoles widest along outer edge.
Translators	0.08 mm long, ca. 0.02 mm wide, opaque.
Caudicles	clear, bulb 0.07 mm in diameter.
Retinaculum	0.18 mm long, head narrowly rounded, shoulders 0.12 mm mm wide, waist ca. 0.07 mm wide, hips 0.10 mm wide. Structure short and broad, with short extensions.

Translator/caudicle type: ls/o

Pollinia apex type: T

Caudicle bulb: C

Retinacula character: S

Pollinarium enlarged about 165x. The arrow here (upper left) is 1mm long. The pollinia here are broad and short, outer ends being broader than the inner end. The vacuole here is wider above than below, usually it is the reverse of this. The retinaculum is short and broad and well constituted, caudicles appear to spread over the translators, both are attached at the waist area of the retinaculum, actually they are attached inwardly from here in an internal cavity.

Hoya sp. UC 295, F. H. Bolster
Placer, Lake Mainit, Surigao, Mindanao, Philippines
Climbing on tree, large cluster of flowers. 50-60



Pollinarium with one pollinia missing and
the retinaculum twisted.

Pollinium

length	0.51 mm
Widest	0.20 mm

Retinaculum

length	0.21 mm
shoulders	0.11 mm
waist	0.05 mm
hips	0.09 mm
ext.	0.05 mm

From this pollinium the species appears to
be *H. merrillii* Schlechter

Translator/caudicle type: ls/o

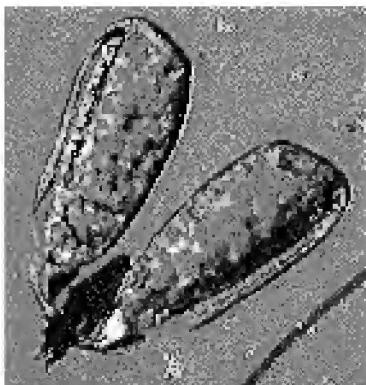
Pollinia apex type: T

Caudicle bulb: ?

Retinacula character: S ?

Hoya lanceolata Wallich ex Don 1825

Flower via Torill Nyhuus, Sweden.



Top view of the pollinarium enlarged about 65x.

Compare the pollinia here to *Hoya bella* Hooker.

Here the pollinia are much shorter relatively. The retinacula are both long but this one has a narrowing near and lower apex. Both have well-developed translators (long) and caudicles.

Top view of Pollinarium enlarged about 165x. Note how broad and relatively short the pollinia are, how the pellucid sterile edge does not come near the attached apex, also the large vacuole in from this edge. There are small shoulders on the retinaculum and 2 sets of protrusions lower down (these protrusions I believe are also present in *Hoya bella* Hooker) The translators support a large bulbous end of the caudicle, somewhat triangular in outline in flat view.



Pollinia

length	0.51 mm
widest	0.22 mm

Retinaculum

length	0.27 mm
shoulder	0.09 mm
hip	0.05 mm
waist	0.08 mm
extensions	0.02 mm

Translators

length	0.15 mm
depth	0.02 mm
width	0.02 mm

Caudicle (cone shaped end)
bulb diam. 0.08 mm

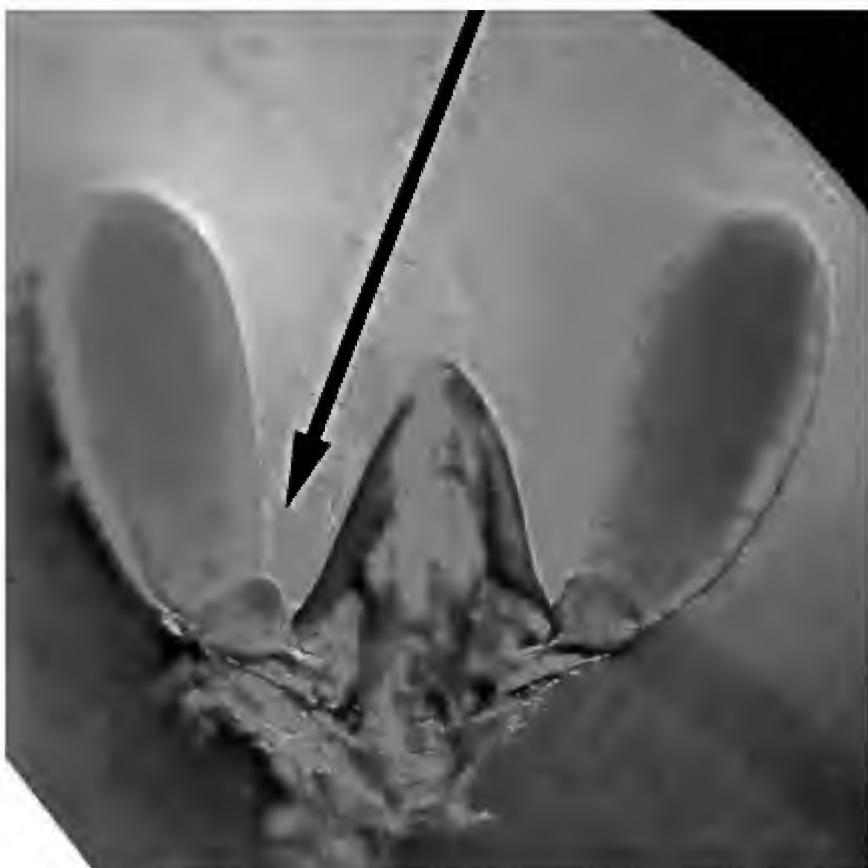
Translator/caudicle type:
l/cw

Pollinia apex type: R

Caudicle bulb: G

Retinacula character: HE

***Hoya hamiltoniorum* Lamb et al. 2014**



Pollinarium
enlarged ca. 100x.

Pollinaria
length 0.51 mm
widest 0.22 mm

Retinaculum
length 0.42 mm
shoulder 0.36 mm
waist 0.19 mm
hip 0.20 mm
ext 0.13 mm

Translator
length 0.19 mm
wide 0.04 mm

Caudicle
bulb diam. 0.12 mm

Translator/caudicle type: ls/o

Pollinia inner end type: R

Caudicle bulb: finely G

Retinacula character: HE

Hoya gigantangensis Kloppenburg 1992
from the **type** material #36787(PNH)



Pollinium enlarged about 165x.

Pollinia

length	0.51 mm
widest	0.15 mm

Retinaculum

length	0.19 mm
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Translator/caudicle type: ls/o

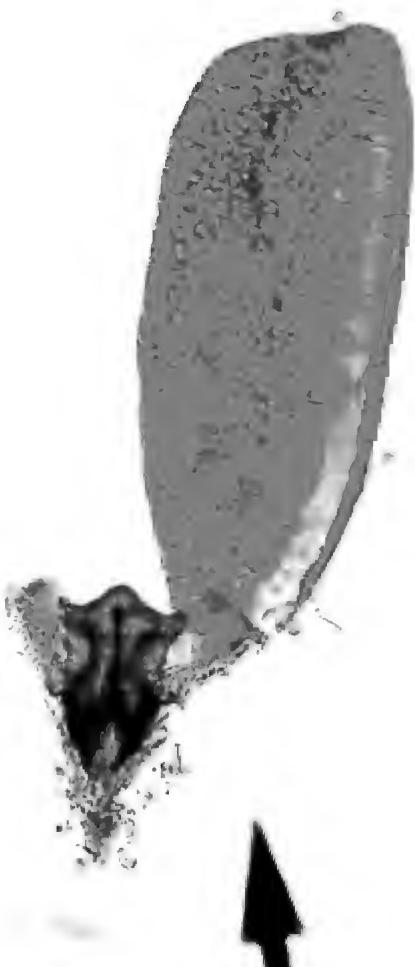
Pollinia inner end type: T

Caudicle bulb: ?

Hoya uafatoensis Kloppenburg 2017

Hoya sp. W 10339

labeled *H. diptera* but not that species W 10339 Upolu diptera. Collected 3 April 1997
Upolu, Samoa by Dr. Art Whistler 400m elevation. White flowers red at base.



Pollinaria enlarged about 165x.

Pollinium

length	0.51 mm
widest	0.20 mm

Retinaculum

length	0.12 mm
shoulders	0.11 mm
waist	0.05 mm
hip	0.08 mm
extensions	0.04 mm

Translators

length	0.09 mm
depth	0.01 + mm

Caudicle

bulb diameter 0.05 mm

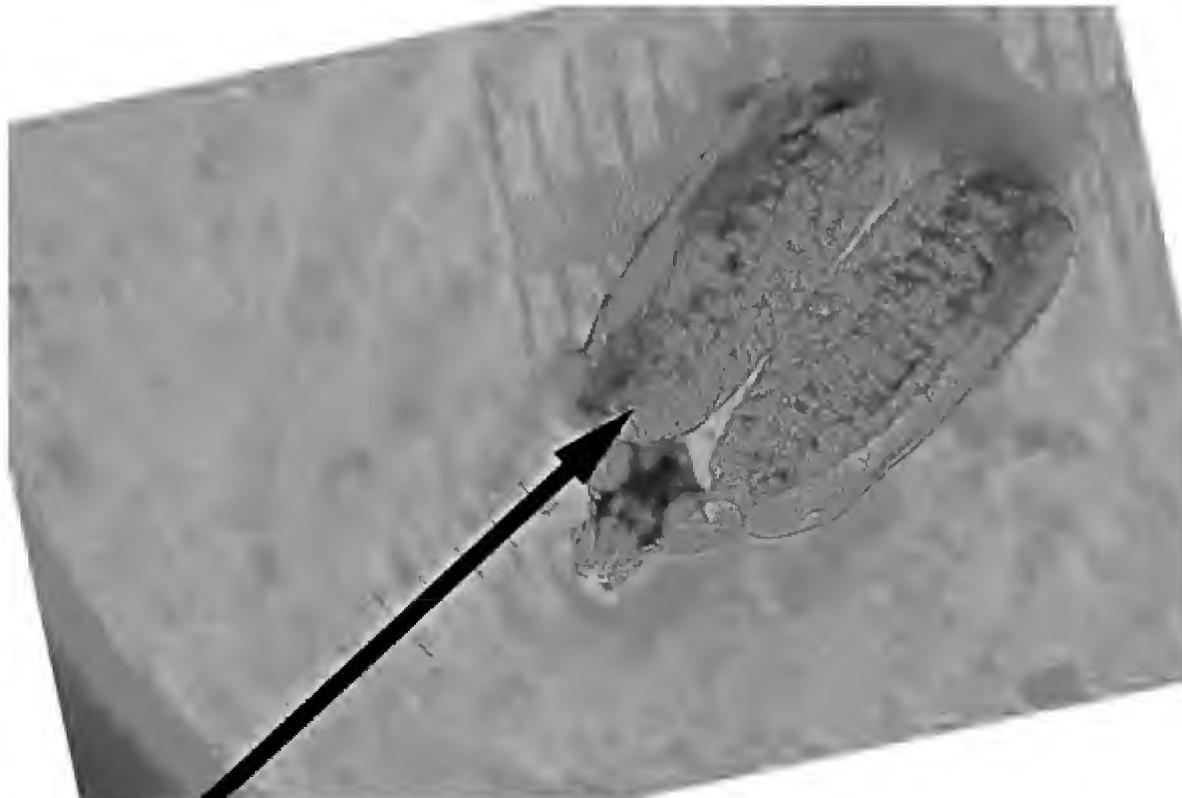
Translator/caudicle type: ls/o

Pollinia inner end type: T

Caudicle bulb: C ?

Retinacula character: HU

Hoya isabelaensis Kloppenburg, Siar & Ferreras 2011



Pollinaria enlarged about 180x.

Pollinium

length	0.51 mm
widest	0.20 mm

Translator

length	0.12 mm
depth	0.02 mm

Retinaculum

length	0.12 mm
shoulder	0.12 mm
waist	0.05 mm
hip	0.09 mm
ext.	0.06 mm

Caudicle

bulb diam.	0.05 mm
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Type: G

Ratios: pol./width 2.6
pol./ret. 2.8

Pollinia inner end type: T

Retinacula type: S

Hoya odorata Schlechter CAHUP 19258

Collected by B. F. Harriail 20 Oct. 1968, Mt. Miquiling on summit of peak two.
Elevation 1114 meters. Flower white, leaf very small.



Retinaculum enlarged about 165x. This is the same as 18041 (B); 13176 (UC); 29638 (PNH); 19258 (CAHUP). Pollinia wide and short, retinaculum with distinct head, waste area.

Pollinium

length	0.51 mm
widest	0.21 mm

Retinaculum

length	0.19 mm
shoulder	0.12 mm
waist	0.08 mm
hip	0.10 mm
ext.	0.05 mm

Translators

length	0.10 mm
widest	0.04 mm

Translator/caudicle type: ls/o

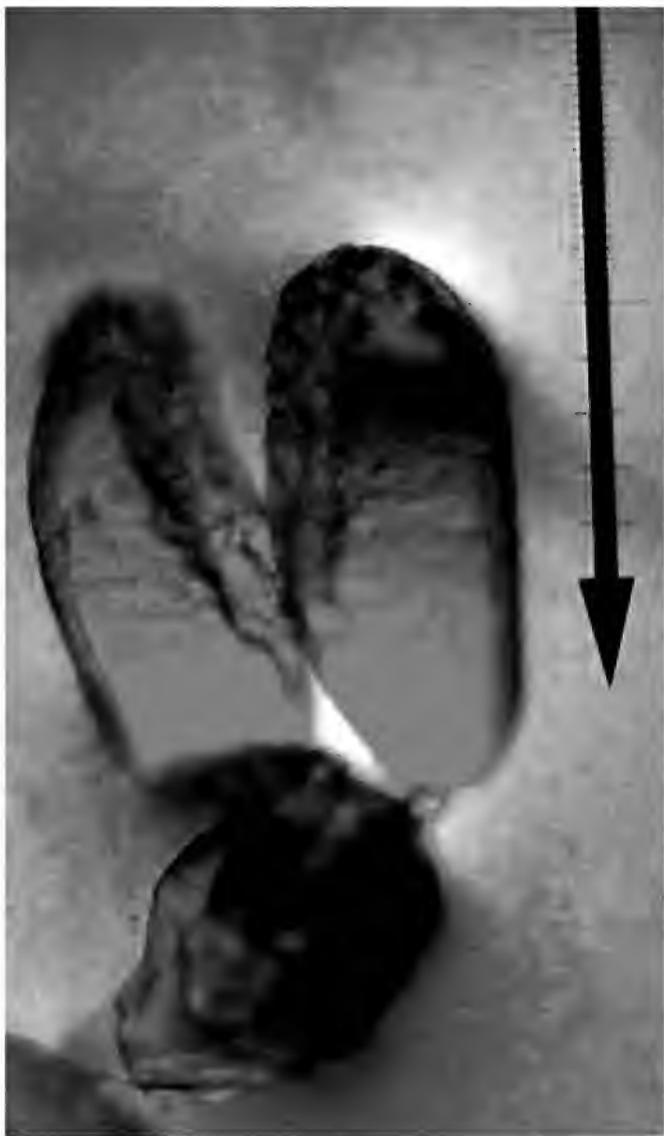
Pollinia inner end type: T

Caudicle bulb: ?

Retinacula character: S

***Hoya mindorensis* subsp. *hirsuta* Kloppenburg**

ISSN 2329-7336



Pollinaria enlarged ca. 130x.

Pollinium

length	0.50 mm
widest	0.24 mm

Retinaculum

length	0.30 mm
widest	0.25 mm
ext.	0.15 mm

Translator

length	0.10 mm
widest	0.02 mm

Caudicle Type: G

bulb 0.10 x 0.05 mm

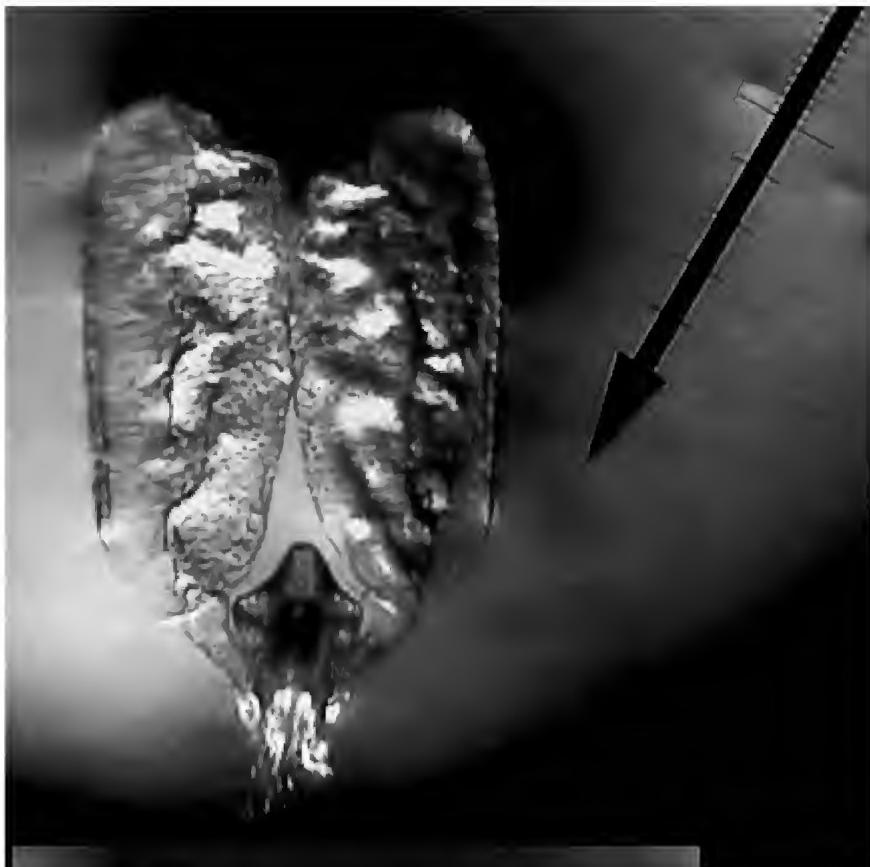
Translator/caudicle type: ls/r

Pollinia inner end Type: R

Retinacula: LH

Here as in all of these subspecies the retinacular extensions turn under the rounded body in one direction and are semi hidden, this may be due to the twisting of the retinaculum upon extraction, all have head areas that are semi block shaped with dorsal short horn like projections.

Hoya landgrantensis Kloppenburg 2009



Pollinarium
enlarged ca. 165x.

Pollinia

length 0.50mm.
widest 0.13 mm.

Retinacula

length 0.12 mm.
shoulder 0.11 mm.
waist 0.04 mm.
hip 0.06 mm.
ext. 0.04 mm.

Translator

length 0.09 mm.
depth 0.05 mm.
width 0.02 mm.

Caudicle

bulb diam. 0.06 mm.
Type: C

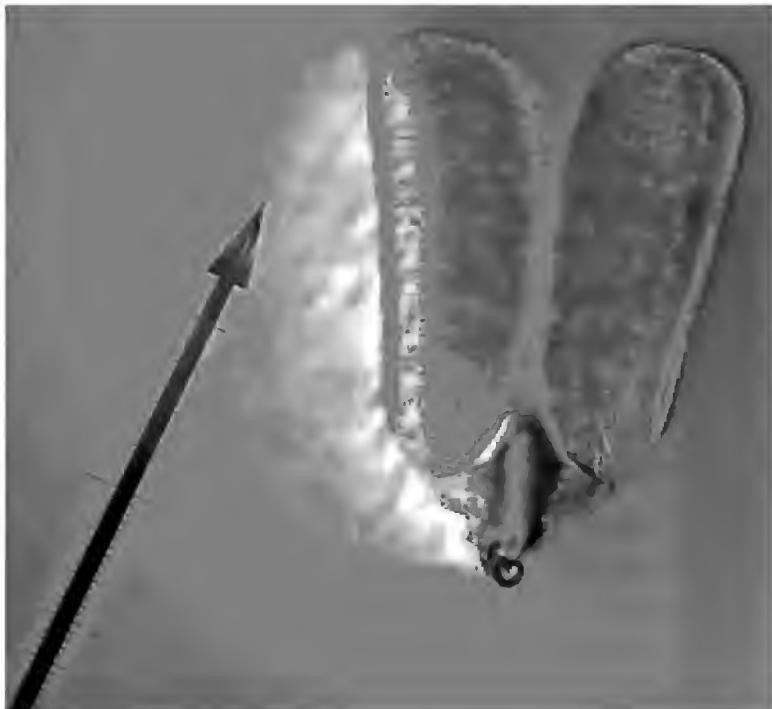


A second pollinarium enlarged ca. 145x. Retinaculum is distinct with broad shoulders and spaced extensions. Caudicle bulb apex is broadly ovate and cupped upper surface of the translator arm is visible on the right translator.

Translator/caudicle type: ls/o
Pollinia inner end type: RT

Caudicle bulb: C
Retinacula character: S

Hoya coronapiana Kloppenburg & Mendoza
(unpublished) GM #131



Pollinarium enlarged ca.
120x

Pollinium

length	0.50 mm
widest	0.19 mm

Retinaculum

length	0.15 mm
shoulder	0.15 mm
waist	0.07 mm
hip	0.09 mm
ext.	0.04 mm

Translator

length	0.10 mm
wide	0.04 mm

Caudicle

bulb diam. 0.05 mm

Translator/caudicle type: ls/o

Pollinia apex type: R

Caudicle bulb: C ?

Retinacula character: S

Hoya tauensis Kloppenburg sp. nova

Published in Asklepios 111: 14.2011



Pollinarium with one pollinia lost.
Enlarged about 165x. The dark arrow is 0.1 mm.
long. The pollinium has a pellucid edge as all
hoya species have, The translators are short, the
retinaculum had well developed shoulders and
waist.

Pollinia

length	0.50 mm.
widest	0.20 mm.

Retinaculum

length	0.15 mm. to crotch
shoulder	0.11 mm.
waist	0.04 mm.
hip	0.07 mm.
extensions	0.05 mm.

Translators

length	0.10 mm.
depth	0.024 mm.

Caudicle

bulb diam.	0.05 mm.
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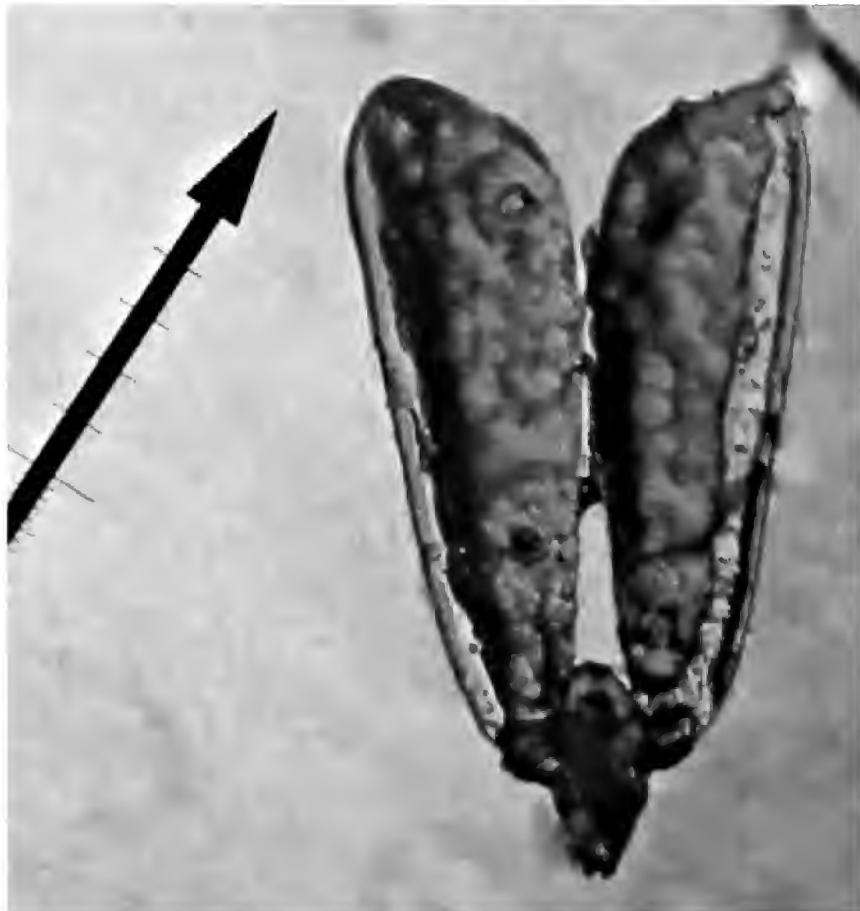
Enlarged view of the retinaculum, showing translators somewhat deteriorates and the caudicles slightly collapsed. Retinaculum is about average sized for hoyia species.

Ratio: poll/ret 2.5
poll length/width 2.5
Retinacula type: S

Translator/caudicle type: ls/o
Pollinia inner ends: R



***Hoya cumingiana* subsp. *kamangongensis* Kloppenburg & Mendoza
(unpublished) GM #176**



Pollinium enlarged
150x

Pollinium		Translator/caudicle type: ls/o
length	0.50 mm	
widest	0.17 mm	Pollinia apex type: T
Retinaculum		Caudicle bulb: C ?
length	0.15 mm	
shoulder	0.08 mm	Retinacula character: S
waist	0.05 mm	
hip	0.08 mm	
ext.	0.02 mm	
Translator		Caudicle
length	0.08 mm	bulb diam. 0.05 mm
widest	0.02mm	

***Hoya cumingiana* subsp. *catanauanensis* Kloppenburg & Mendoza**



Pollinium

length	0.50 mm
widest	0.15 mm

Retinaculum

length	0.20 mm
shoulder	0.14 mm
waist	0.09 mm
hip	0.10 mm
ext.	0.05 mm

Translator

length	0.10 mm
widest	0.04 mm

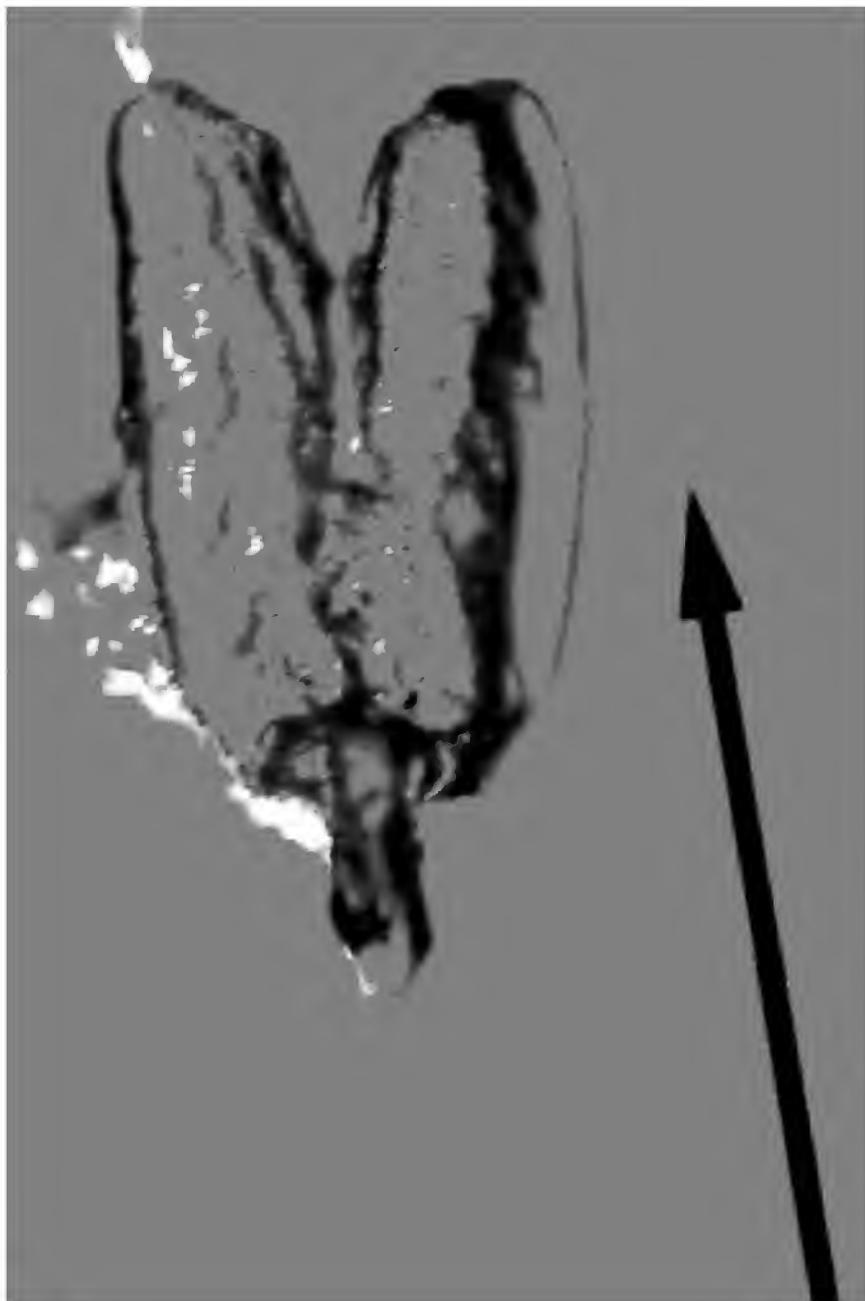


Above enlarged 120x

Above enlarged 70x

Translator/caudicle type: ls/o most likely **Pollinia inner end type:** T (tapered)

Hoya teodymendozae Kloppenburg & Mendoza
(unpublished) GM #85



Pollinarium enlarged
ca. 170x.

Pollinium

length 0.48 mm
widest 0.19 mm

Retinaculum

length 0.18 mm
shoulder 0.08 mm
hip 0.05 mm
waist 0.07 mm
ext. 0.04 mm

Translator

length 0.07 mm
wide 0.01 mm

Caudicle

bulb diam. 0.05 mm

Translator/caudicle type: ls/o

Pollinia inner end type: RT

Caudicle bulb: G

Retinacula character: E

Hoya sulitii Kloppenburg 2015

M. D. Sulit (PNH) 10147 15 April 1949 Mt. Katanglad, Bukidnon Prov. Mindoro. Flower creamy 1800 m. forest edge (roll 144 drawing 136). I had determined this to be *Hoya cardiophylla* but here the corolla is densely pubescent inside, which negates it being that species.



Pollinarium enlarged about 165x.
The retinaculum is similar to that of *Hoya cardiophylla* but slightly different, also the pollinia are much shorter and the translators although attached well down are here curved inwardly.

Pollinia

length	0.48 mm
widest	0.19 mm

Retinaculum

length	0.26 mm
shoulder	0.12 mm
waist	0.05 mm
hip	0.10 mm

Translator

length	0.17 mm
depth	0.03 mm

Caudicle

bulb diameter	0.05 mm
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Translator/caudicle type: ls/o

Pollinia inner end type: R

Caudicle bulb: C ?

Retinacula character: LS

Hoya crassicaulis Elmer ex Kloppenburg 1995



Pollinarium from the type sheet. The reticule lines below the picture are 1/100 of a mm. between two longest lines is 1/10 of a mm.

The pollinia from the sheet 46116 (UC) appears to be a different sp or subsp.

W 2705 as *H. filiformis* not



Pollinaria enlarged about 165x. The pollinium has germinated within the flower and the pollen tubes can be seen emerging along the pellucid edge of the pollinia. The retinaculum here is skewed so only a side view can be seen and the translators and caudicle are difficult to measure.

Pollinium

length	0.47 mm
widest	0.21 mm

Retinaculum

length	0.15 mm
shoulders	0.11 mm
hips	0.10 mm
waist	0.11 mm
extensions	0.04 mm

Another pollinaria with a better view of the retinaculum and the translators. Caudicle still hidden but linear (collapsed) on the right hand translator. Here the focus does not show the long head of the retinaculum, one of the intricacies of getting precise measurements and depictions of the shape of 3 dimensional complex structural objects.

Translator

length	0.11 mm
widest depth	0.05 mm

Structure is fiddle shaped in flat dimension. Pollen tubes in mass on left central side of pollinium.

Translator/caudicle: ls/o

Pollinia inner end: T

Retinaculum: S

Caudicle bulb: G

***Hoya landgrantensis* subsp. *siniloanensis* Kloppenburg**



Pollinaria enlarged
ca. 120x.

Pollinium

length	0.50 mm
widest	0.22 mm

Translator	
length	0.07 mm
depth	0.02mm

Retinaculum

length	0.15 mm
shoulder	0.13 mm
waist	0.10 mm
hip	0.12 mm
ext	0.05 mm

Caudicle	
bulb diam.	0.05 mm

Translator type: ls/o

Pollinia inner ends R/T (one round the other tapered).

***Hoya blashernaiaeii* subsp. *bigaensis* Kloppenburg & Mendoza**



Pollinaria enlarged ca,
150x.

Pollinium

length	0.50 mm
widest	0.25 mm

Retinaculum

length	0.11 mm
shoulder	0.14 mm
ext.	0.04 mm

Translator

length	0.09 mm
depth	0.03 mm

Caudicle

bulb diam.	0.10 mm
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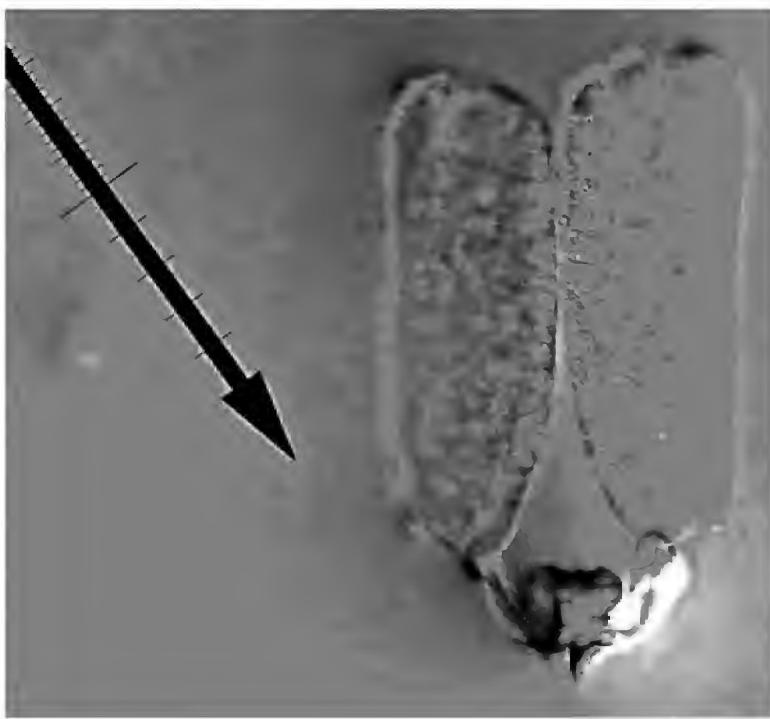
Translator/caudicle

Type: ls/o

Pollinia end type: RT

Retinacula: S

***Hoya coronapiana* subsp. *bakyaanensis* Kloppenburg, Mendoza**



Pollinaria enlarged 120x.

Pollinium

length	0.50 mm
widest	0.20 mm

Retinaculum

length	0.08 mm
shoulder	0.11 mm
extensions	0.04 mm

Translator

length	0.12 mm
widest	0.02 mm

Caudicle	Type: C
bulb diam.	0.05 mm

Translator/caudicle type:
ls/o

Pollinia apex type: R

Retinacula: S

Caudicle is **clear** sub oval in shape, shoulders of retinaculum are globose rounded with no definite waste or hip area. Retinaculum length is here from top to the crotch area.

Hoya mucronulata Warburg 1901



Pollinarium enlarged about 165X.
Outer end of pollinia flattened and broad,
retinaculum large with fairly long translators.

Pollinia

length	0.50 mm
widest	0.20 mm

Retinaculum

length	0.30 mm
shoulders	0.20 mm
waist	0.11 mm
hips	0.13 mm
extensions	0.10 cm

Translators

length	0.16 mm
wide	0.04 mm
depth	0.02 mm

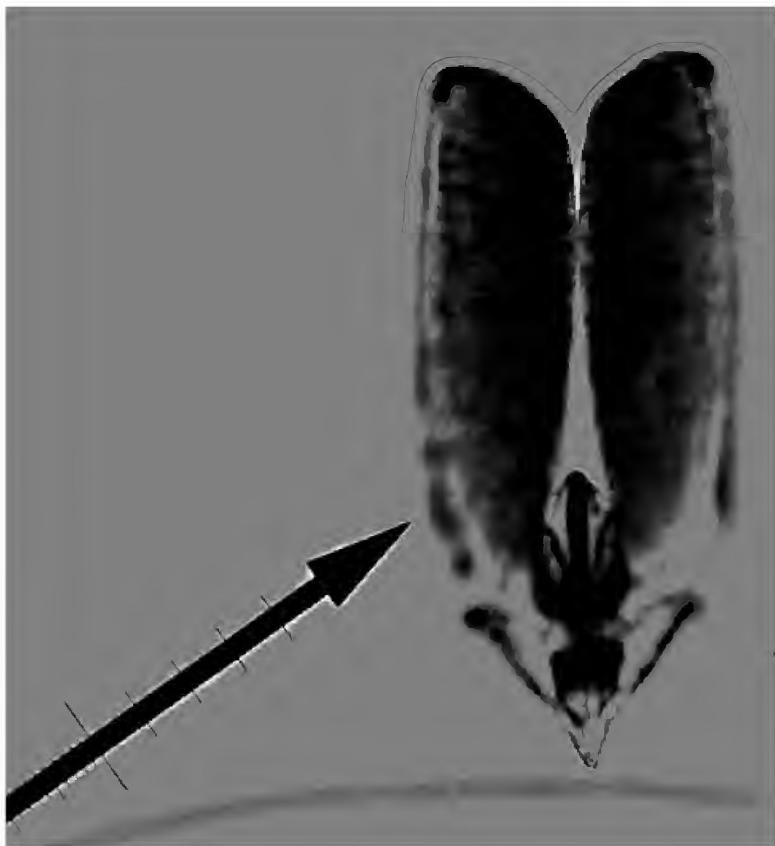
Caudicle

bulb diam.	ca. 0.08 mm
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Pollinia end type: S

Retinacula type: S

***Hoya ranauensis* T. Green & D. Kloppenburg 2014**



Pollinaria enlarged 110x.

Pollinium

length	0.50 mm
widest	0.19 mm

Retinaculum

length	0.15 mm
shoulder	0.12 mm
waist	0.06 mm
hip	0.08 mm
ext.	0.04 mm

Translator

length	0.12 mm
widest	0.02 mm

Translator/caudicle type: ls/o

Caudicle

bulb diam. 0.06 mm

Pollinia inner end Type: T

Retinacula character: LS

Hoya tamaleaaana Kloppenburg 2008
sp. nova W 2705



Pollinarium enlarged about 165x. The pollinium has germinated within the flower and the pollen tubes can be seen emerging along the pellucid edge of the pollinia. The retinaculum here is skewed so only a side view can be seen and the translators and caudicle are difficult to measure.

Pollinium

length	0.47 mm.
widest	0.21 mm.

Retinaculum

length	0.15 mm.
shoulders	0.11 mm.
hips	0.10 mm.
waist	0.11 mm.
extensions	0.04 mm.

Another pollinarium with a better view of the retinaculum and the translators. Caudicle still hidden but linear (collapsed) on the right hand translator. Here the focus does not show the long head of the retinaculum, one of the intricacies of getting precise measurements and depictions of the shape of 3 dimensional complex structural objects.

Translator

length	0.11 mm.
widest depth	0.05 mm.

Translator Type: ls/o

Pollinia inner end type: F

Caudicle bulb: G

Retinacula character: S

Structure is fiddle shaped in flat dimension. Pollen tubes in mass on left central side of pollinium.



Hoya luatekensis Kloppenburg 2017

W 7605

Collected by Dr. Whistler Ta'u 19 Dec. 1990 flower white, elev. 350m.

Probably *Hoya whistlerii* Kloppenburg. Pollinia appears to be a little crumples so length more like 0.55 mm

W 7605 H. whistlerii



Pollinium enlarged about 165x.

length	0.47 mm
widest	0.20 mm

Retinaculum on the left with translators attached enlarged about 100x. The object is not laying flat, a little at an angle.

Translator/caudicle type: ls/o

Pollinia apex type: R

Caudicle bulb: G

Retinacula character: HU



Retinaculum also enlarged about 165x, again skewed with translator and caudicle on left side.

Retinaculum

length	0.17 mm
shoulders	0.14 mm
waist	0.06 mm
hip	0.09 mm
extensions	0.04 mm

Translator

length	0.18 mm
depth	0.06 mm

Caudicle bulb cup shaped (ascus) 0.16 x 0.06 mm

Hoya sp. PNH 5733

Collected by Barbon, Garcia & Sagcal at Samar Brg. Inuntan, Basey, 29 Jan 1992
studied 5 Nov. 1993.



Pollinarium enlarged
about 150x.

Pollinium

length	0.47 mm
widest	0.16 mm

Retinaculum

length	0.18 mm
shoulder	0.15 mm

Translators

length	0.10 mm
depth	0.02 mm

Caudicle

bulb diam. 0.07 mm

Translator Type: ls/o

Pollinia inner end
type: T

Caudicle bulb: G ?

Poring Hot Springs, Saba, Malaysia TG



Pollinium

length	0.47 mm
widest	0.15 mm

Retinaculum

length	0.18 mm
shoulder	0.09 mm
waist	0.05 mm
hip	0.08 mm
ext.	0.04 mm

Translator

length	0.12 mm
widest	0.03 mm

Caudicle

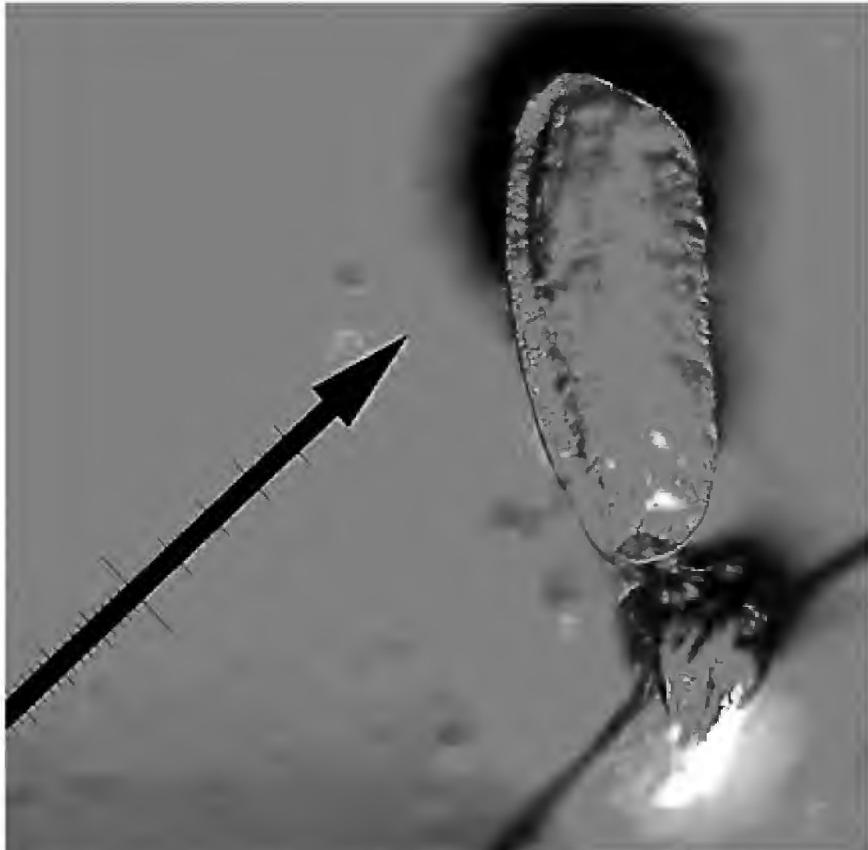
bulb diam.	0.05 mm
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Translator/caudicle type:
ls/o

Pollinia inner end type: T

Retinacula character: LS

***Hoya persicina* subsp. *triapexa* Kloppenburg & Mendoza
(unpublished) GM #53**



Pollinarium
enlarged ca. 140x.

Pollinium
length 0.46 mm
widest 0.19 mm

Retinaculum
length 0.13 mm
shoulder 0.16 mm
waist 0.10 mm
hip 0.14 mm
ext. 0.07 mm

Translator
length 0.08 mm
depth 0.03 mm

Caudicle
bulb diam. 0.07 mm

Translator/caudicle type: ls/o

Pollinia end type: T

Caudicle bulb: C

Retinacula type: S

***Hoya blashernaezii* subsp. *diluta* Kloppenburg & Cajano**
(unpublished) AC pale #4 aff. *siariae*



Pollinaria enlarged ca.
100x. A composite of 2
pollinaria.

Pollinium

length	0.45 mm
widest	0.17 mm

Retinaculum

length	0.15 mm
shoulder	0.15 mm
waist	0.05 mm
hip	0.10 mm
ext.	0.02 mm

Translator

length	0.10 mm
wide	0.02 mm

Caudicle

bulb diam	0.07 mm
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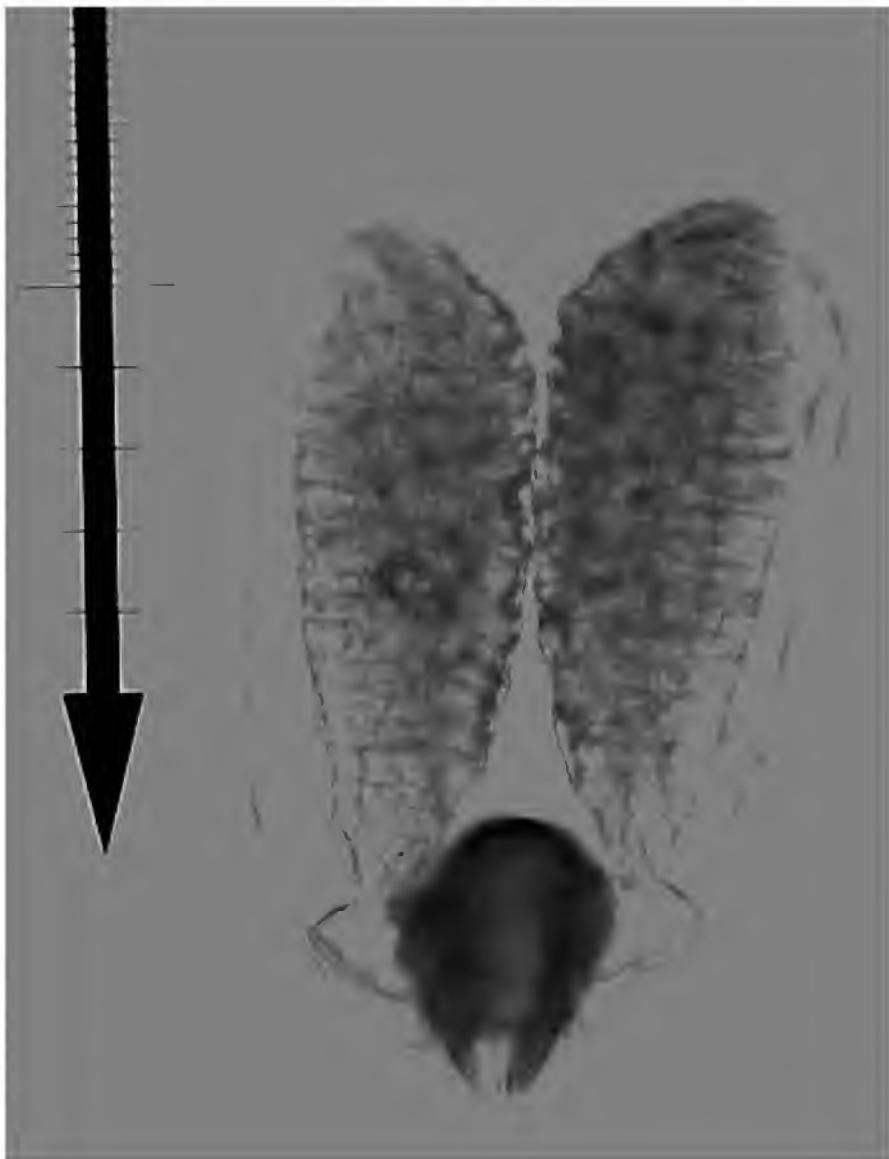
Translator/caudicle type: ls/o

Pollinia inner apex type: F

Caudicle bulb: ?

Retinacula character: S

Hoya corollanervia Kloppenburg & Mendoza
(unpublished) GM #157



Pollinarium
enlarged 200x

Pollinium
length 0.45mm
widest 0.20 mm

Caudicle
bulb diam. 0.05 mm

Retinaculum
length 0.15 mm
widest 0.15 mm
ext. 0.04 mm

Translator/caudicle type: ls/o

Translator
length 0.13 mm widest 0.03 mm

Pollinia apex type: R

Caudicle bulb: G Retinacula character: R

Pollinia Types 2018-1C
ls/o (cont.)

189. **Hoya myrmecopa** subsp. **kapatalanensis** Kloppenburg, Siar, Cajano,
Guevarra & Carandang 2013
190. **Hoya persicina** subsp. **lalawinanensis** Kloppenburg & Mendoz
191. **Hoya crassicaulis** Elmer ex Kloppenburg 1995
192. **Hoya tamayensis** Kloppenburg & Mendoza
193. **Hoya** sp. IML 1056
194. **Hoya aurantiaca** Kloppenburg & Siar 2009 **Type** clone
195. **Hoya aurantiaca** subsp. **armenia** Kloppenburg & Mendoza
196. **Hoya samoalbiflora** Kloppenburg 2017
- 197 **Hoya blashernaezii** Kloppenburg 1999
198. **Hoya olosegaensis** Kloppenburg 2017
199. **Hoya solaniflora** Schlechter 1913
200. **Hoya catanduanensis** Kloppenburg & Mendoza
201. **Hoya davidgoyderiae** Kloppenburg & Mendoza
202. **Hoya fitchii** Kloppenburg 2009
203. **Hoya liljebjorniana** Kloppenburg & Mendoza
204. **Hoya ralphdavisiae** Kloppenburg, Mendoza & Ferreras 2014
205. **Hoya blashernaezii** subsp. **maragondonensis** Kloppenburg & Mendoza
206. **Hoya opposita** G. Don 1837
207. **Hoya vicencioana** subsp. **quezonensis** Kloppenburg 2015
208. **Hoya blashernaezii** subsp. **ferrerasiana** Kloppenburg & Mendoza
209. **Hoya pimenteliana** Kloppenburg 1999
210. **Hoya** sp. Ramos & Edano 1927 (UC) 49395
211. **Hoya quinquinervia** Warburg 1904
212. **Hoya vicencioana** Kloppenburg, Siar, Cajano, Guevarra & Carandang 2013
213. **Hoya** sp. 349 (PNH)
214. **Hoya nuevaensis** Kloppenburg & Mendoza
215. **Hoya inawaensis** Kloppenburg & Mendoza
214. **Hoya heuschkeliana** subsp. **cajanoae** Kloppenburg & Siar 2001
215. **Hoya bordenii** Schlechter 1906
216. **Hoya macgregorii** Schlechter 1906
217. **Hoya inconspicua** Hemsley 1894
218. **Hoya blashernaezii** subsp. **carnea** Kloppenburg & Cajano
219. **Hoya nuuuliensis** Kloppenburg & Siar 2008
220. **Hoya blashernaezii** subsp. **eudaimononia** Kloppenburg & Mendoza
221. **Hoya** sp. PNH 11591 as **H. incrassata**
222. **Hoya** sp. *affinis australis* #941135
223. **Hoya histora** Kloppenburg 2015
224. **Hoya verticillata** (Vahl) G. Don 1837
225. **Hoya indaysarae** M. N. D. Medina, R. J. T. Villanueva, R. D. Kloppenburg
et A.Cabras
226. **Hoya blashernaezii** subsp. **aurantiaca** Kloppenburg & Mendoza
227. **Hoya lasiantha** Korthals ex Blume 1848

228. ***Hoya maximowayetii*** Kloppenburg 2014
229. ***Hoya baguioensis*** Kloppenburg 2017
230. *Hoya* sp. PNH 39370 Quisumbing 1957
231. ***Hoya mata-ole-afiensis*** Kloppenburg 2015
232. ***Hoya coronarosea*** Kloppenburg & Mendoza
233. ***Hoya multisepala*** Kloppenburg & Mendoza
234. ***Hoya blashernaezii* subsp. *nagcarlanensis*** Kloppenburg & Mendoza
235. ***Hoya blashernaezii* subsp. *parviora*** Kloppenburg & Mendoza
236. ***Hoya spartioides*** (Kuntz) Kloppenburg 2001
237. ***Hoya blashernaezii* subsp. *taywanensis*** Kloppenburg & Mendoza
238. ***Hoya papaschonii*** Rodda 2014
239. ***Hoya blashernaezii* subsp. *karencaseae*** Kloppenburg & Mendoza
240. ***Hoya blashernaezii* subsp. *marizae*** Kloppenburg & Mendoza
241. ***Hoya concava*** Kloppenburg, Siar, Cajano & Carandang 2014
242. ***Hoya carmelae*** Kloppenburg, Siar & Ferreras 2010
243. ***Hoya eburna* subsp. *rosea*** Kloppenburg & Mendoza
244. ***Hoya ginabrigidana*** Kloppenburg & Mendoza
245. ***Hoya samarensis* Kloppenburg 2014**
246. ***Hoya foliapalmata*** Kloppenburg & Mendoza
247. ***Hoya crassicaulis*** Elmer ex Kloppenburg 1995
248. ***Hoya heuschkeliana* subsp. *mendozai*** Kloppenburg
249. ***Hoya navicula*** Kloppenburg & Mendoza 2015
250. ***Hoya auroraensis*** Kloppenburg & Mendoza
251. ***Hoya samarensis*** Kloppenburg & Siar 2012
252. ***Hoya coronarubra*** Kloppenburg & Mendoza
253. ***Hoya diptera*** Seemann 1861
254. ***Hoya latifolia*** G. Don 1838
255. ***Hoya marquisii*** Kloppenburg & Mendoza
256. ***Hoya heuschkeliana* subsp. *marionii*** Kloppenburg & Ferreras 2014
257. *Hoya* sp. IML 850 affinis H. macgregorii
258. ***Hoya camphorifolia*** Warburg 1904 (not that sp.)
259. ***Hoya williamsiana* subsp. *calendulina*** Kloppenburg & Mendoza
260. ***Hoya cyclaminea*** Kloppenburg & Mendoza
261. ***Hoya viscayaensis*** Kloppenburg & Mendoza
262. ***Hoya bakerensis*** Kloppenburg & Mendoza
263. ***Hoya marananiae*** Kloppenburg, Siar, Guevarra & Carandang 2015
264. ***Hoya nakarensis* subsp. *cadmia*** Kloppenburg & Mendoza
265. ***Hoya lagyoensis*** Kloppenburg & Mendoza
266. ***Hoya martinii* subsp. *daraitonensis*** Kloppenburg & Mendoza
267. ***Hoya martinii*** Kloppenburg & Mendoza
268. *Hoya* sp. UC s.n. Taylor
269. ***Hoya unruhiana*** Klopp., Siar, Mend., Cajano, Guevarra & Carandang 2013
270. ***Hoya subrosea* subsp. *inawaensis*** Kloppenburg & Mendoza

***Hoya myrmecopa* subsp. *kapatalanensis* Kloppenburg, Siar,
Cajano, Guevarra & Carandang 2013**



Pollinium enlarged about 165x.

Pollinium

length 0.45 mm
widest 0.16 mm

Retinaculum

length 0.13 mm
should 0.12 mm
waist 0.08 mm
hip 0.09 mm
ext 0.05-.09 mm

Translator

length 0.12 mm
depth 0.02 mm

Caudicle

bulb 0.05 mm

Translator/caudicle type: ls/o

Pollinia inner apex type: RT

Caudicle bulb: C ?

Retinacula character: R

***Hoya persicina* subsp. *lalawinanensis* Kloppenburg & Mendoza
(unpublished) GM #138**



Pollinaria enlarged ca.
100x.

Pollinium

length	0.45 mm
widest	0.19 mm

Retinaculum

length	0.12 mm
shoulder	0.14 mm
waist	0.06 mm
hip	0.10mm
ext	0.05 mm

Translator

length	0.10 mm
wide	0.02 mm

Caudicle

bulb diam.	0.06 mm
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Translator/caudicle type:
ls/o

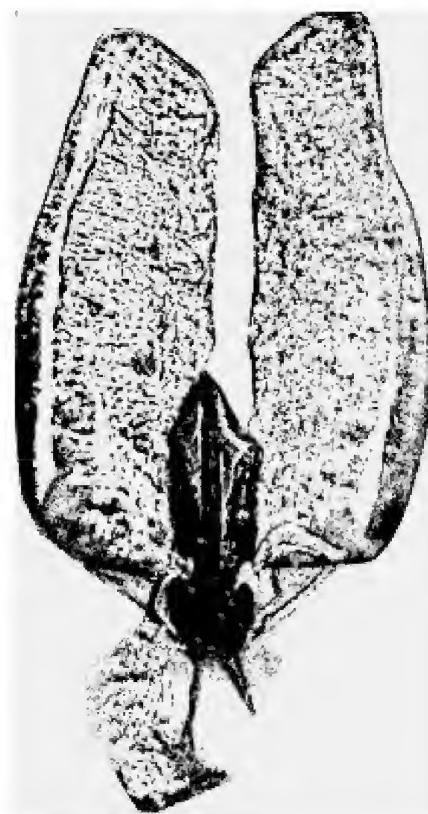
Pollinia inner apex type:
T

Caudicle bulb: C

Retinacula character: S

***Hoya crassicaulis* Elmer ex Kloppenburg 1995**

Pollinarium from Edano 46116 (1925) Capiz Panay, Pasol River, Philippines.



Magnified approximately 165x.

Pollinium

length:	0.45 mm
widest:	0.14 mm

Retinaculum

length:	0.22 mm
shoulder:	0.08 mm
waist:	0.06 mm
hip:	0.08 mm
ext.:	0.05 mm

Translators

length:	0.09 mm
depth:	0.01 mm

Caudicle

bulb depth:	0.04 mm
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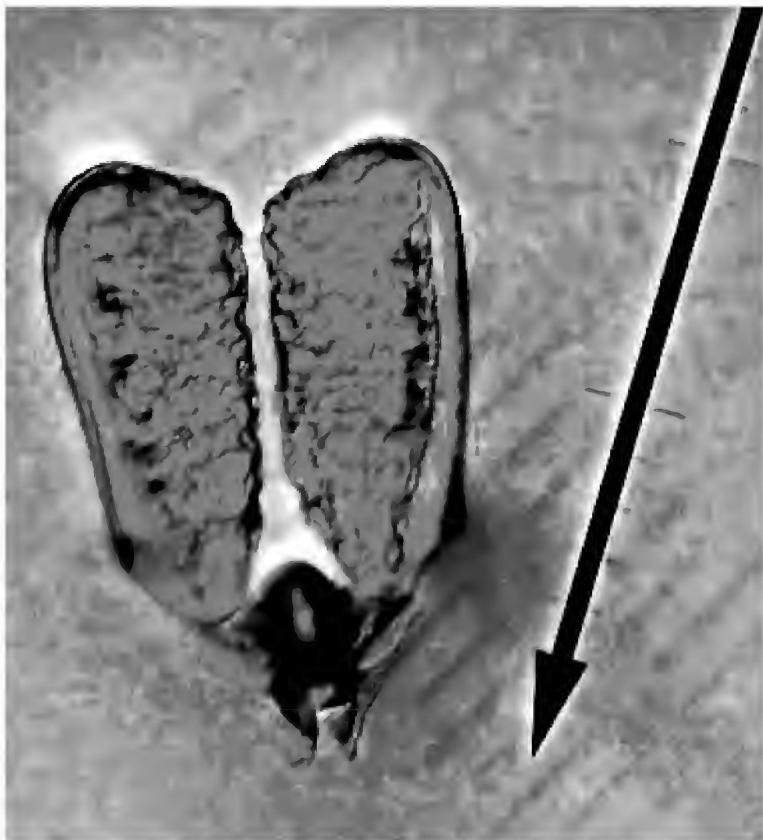
Translator/caudicle type: ls/o

Pollinia inner apex type: T

Caudicle bulb: ?

Retinacula character: E

Hoya tamayensis Kloppenburg & Mendoza
(unpublished) GM #142



Pollinaria enlarged ca.
130x.

Pollinium

length	0.45 mm
widest	0.20 mm

Retinaculum

length	0.13 mm
shoulders	0.14 mm
waist	0.08 mm
hip	0.10 mm
ext.	0.07 mm

Translator

length	0.10 mm
widest	0.02 mm

Caudicle

bulb diam.	0.05 mm
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Translator/caudicle type: ls/o

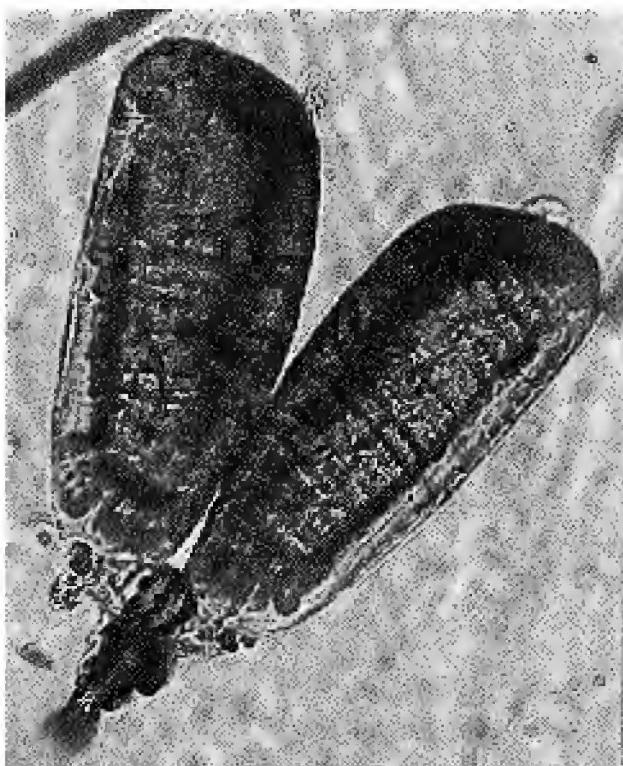
Pollinia inner end: T

Caudicle bulb: C

Retinacula character: S

Hoya sp. IML 1056

This is a fuzzy yellow bordered flower collected 9/8/00 at Ted Green's, Kaaawa Hawaii.



Pollinarium enlarged about 165x. The pollinia are relatively short and broad, rounded at both ends. The retinaculum is relatively narrow and the translators are short.

Pollinia

length	0.44 mm broad with rounded ends.
widest	0.19 mm

Retinaculum

length	0.13 mm to crotch.
shoulder	0.05 mm wide.
waist	slightly more narrow.
hips	slightly wider.
extensions	0.03 mm long

Translators

length	0.07 mm
widest	ca. 0.02 mm wide, dense.

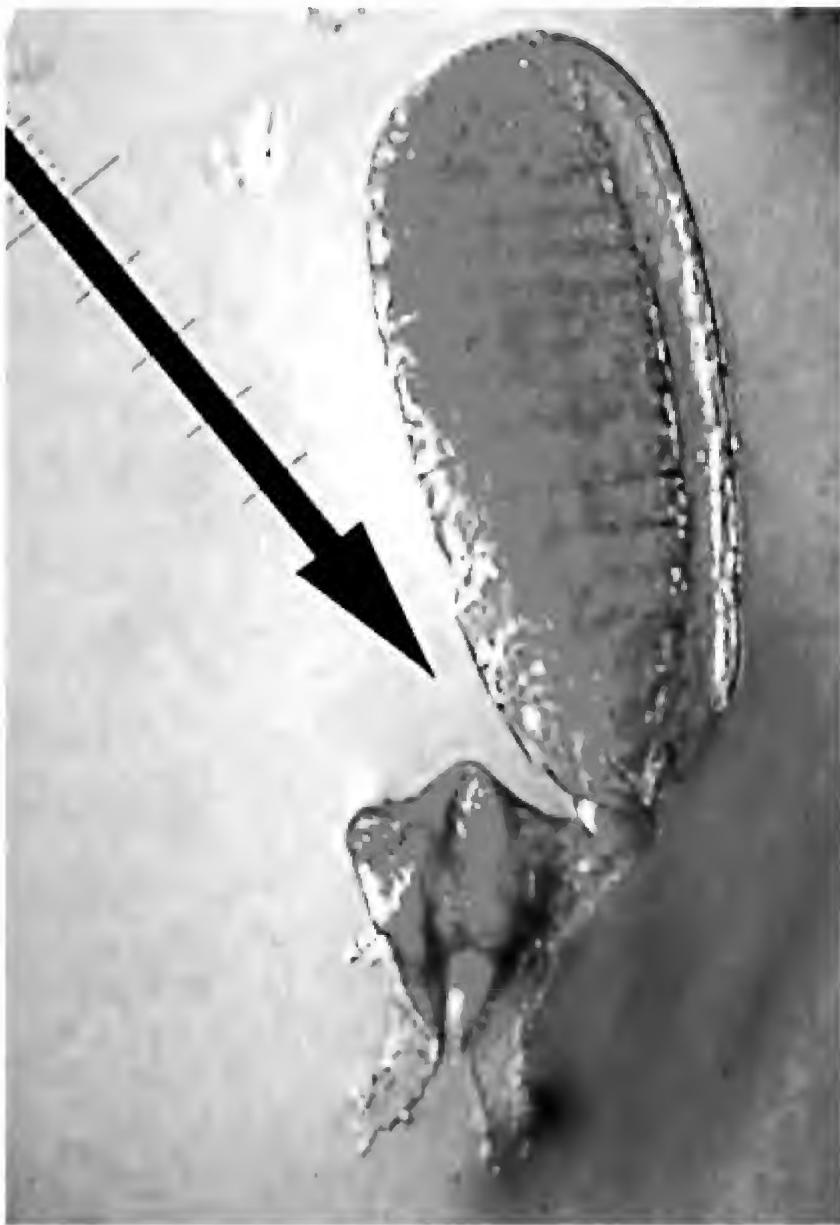
Retinacula character: LS

Caudicles

bulb	ca. 0.04 mm in diameter, but difficult to measure, clear.
------	---

Translator/caudicle type: ls/o **Pollinia inner end:** RT **Caudicle bulb:** G ?

***Hoya aurantiaca* Kloppenburg & Siar 2009 Type clone**



Pollinium

length	0.44 mm
widest	0.19 mm

Retinaculum

length	0.11 mm
shoulder	0.15 mm.
waist	none
hip.	none
ext.	0.06 mm

Translator

length	0.10 mm
depth	0.02 mm

Caudicle

bulb diam. 0.05 mm

Type: C

Ratios: l/w 2.3
l/r 2.8

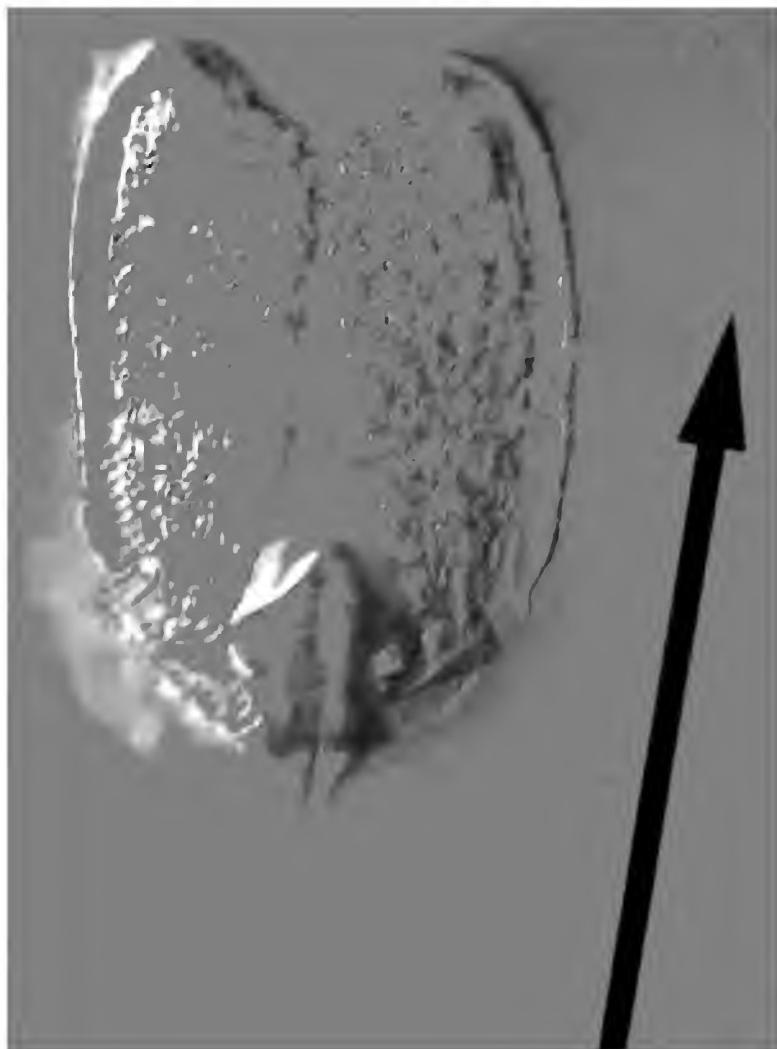
Translator/caudicle type: ls/o

Retinacula character: S

Pollinia inner end: R

Pollinarium with one pollinium missing enlarged about 165x.

***Hoya aurantiaca* subsp. *armenia* Kloppenburg & Mendoza**
(unpublished) GM #124



Pollinaria enlarged ca.
170x

Pollinium

length	0.44 mm
widest	0.19 mm

Retinaculum

length	0.15 mm
shoulder	0.16 mm
waist	0.10 mm
hip	0.11 mm
ext.	0.05 mm

Translator

length	0.10 mm
wide	0.03 mm

Caudicle

bulb diam.	0.05 mm
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Translator/caudicle type:
ls/o

Pollinia apex type: T

Caudicle bulb: G ?

Retinacula character: S

Hoya samoalbiflora Kloppenburg 2017

W 3961

Collected by Dr. Whistler 29 Aug. 1978, Upolu, Samoa, elevation 1050m, flowers white.



Pollinarium parts enlarged about 165x, again I had difficult to recover the structure for the anthers were unusually attached under the stylar table and retinacula buried beneath and also very narrow so I could not get it to lay flat. Translator can be seen at the bottom end of the pollinia and the clear caudicle over the lower left side of the retinacula which is laying on its side.

Pollinium

length	0.44 mm
widest	0.21 mm

Retinaculum

overall length	0.21 mm
----------------	---------

Translator

length	0.09 mm
depth	0.02 mm

Caudicle

bulb diameter 0.07 mm

Translator/caudicle type: ls/o

Pollinia apex type: R

W 3961 29 Aug. 1978 Upolu, Samoa originally as *H. filiformis* Reich. then as *Hoya betchei* Schltr. Dec. 1990. Neither sp.

***Hoya blashernaezii* Kloppenburg 1999**

From cuttings collected by Hernaez, **Type** material 97094 (BISH).



Magnified 165x.

Pollinarium enlarged about 165x. The pollinia are short and broad, outer apical ends tapered inward. The retinaculum is broad and fat. Note here the light colored spots near the pollinia on the head of the retinaculum that are short horn-like projections, the extensions are large and well developed.

Pollinia

length	0.44 mm
widest	0.20 mm

Retinaculum

length	0.27 mm
shoulder	0.20 mm
waist	0.20 mm
hip	0.20 mm
ext.	0.11 mm

Translator

length	0.07 mm
depth	0.02 mm

Caudicle

bulb diam. 0.08 mm

Hip area is only slightly curved inward, so only slight differences in measurements. Translators are exceptionally short.

Type: C

Translator/caudicle type: ls/o

Retinacula character: LN

Pollinia apex type: F

Hoya olosegaensis Kloppenburg 2017
W 3081 (HAW)

Retinaculum and translators enlarged about 165x.



Retinaculum

length	0.17 mm
shoulders	0.11 mm
waist	0.05 mm
hip	0.08 mm
extensions	0.05 mm

Translator

length	0.13 mm
depth	0.03 mm



Retinacula type: S

Translator/caudicle: ls/o ?

Pollinium enlarged about 165x.
This structure did not remain with the caudicle and Retinaculum and may be skewed or flattened some. It appears to be distorted in the upper portion and the pellucid edge is barely visible.

Here the length is 0.44 mm
widest 0.18 mm

Hoya solaniflora Schlechter 1913

From the Type #18214 *Hoya solaniflora* Schlechter (UC): Type 1200m forest of Finesterreich. (Window Mountains).



Pollinarium enlarged about 165x.

Translator/caudicle type: ls/o

Pollinia apex type: R

Retinacula character: S

Pollinarium is a result of
multiple photos since the retinaculum

would not adhere to the pollinia or vice versa:

Pollinia short and thick

length	0.44 mm
widest	0.20 mm

Retinaculum

length	0.23 mm
shoulder	0.13 mm wide
waist	0.07 mm
hips	0.11 mm wide.
extensions	extremely short.

Translators

length	0.07 mm (very short and narrow). with a wide cupped top.
depth	0.03 mm

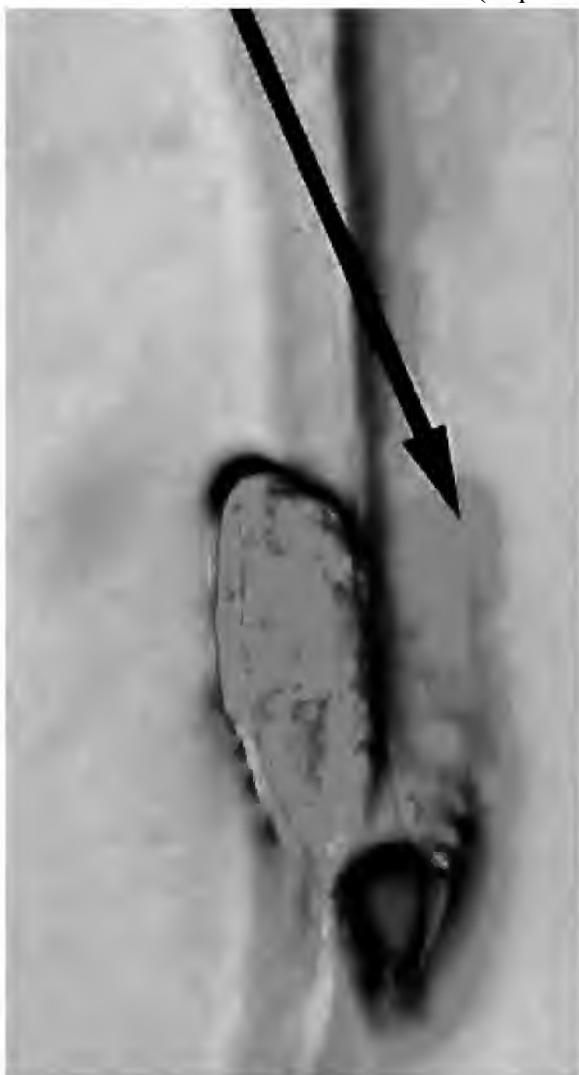
Caudicles

Probably large bulb ca. 0.12 mm in diameter.

Hoya catanduanensis Kloppenburg & Mendoza

(unpublished) GM #140

Pollinaria enlarged ca. 110x.



Pollinium

length	0.44 mm
widest	0.17 mm

Retinaculum

length	0.17 mm
shoulder	0.14 mm
waist	0.06 mm
hip	0.08 mm
ext	0.05 mm

Translator

length	0.10 mm
widest	0.02 mm

Caudicle

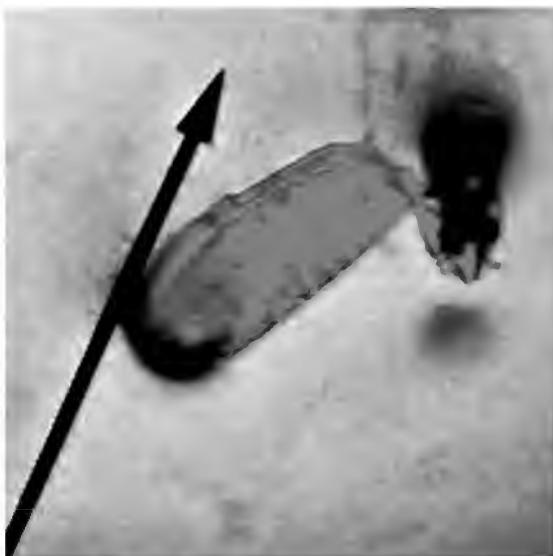
bulb diam.	0.05 mm
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Translator/caudicle type: ls/o

Pollinia inner apex type: T

Caudicle bulb: C ?

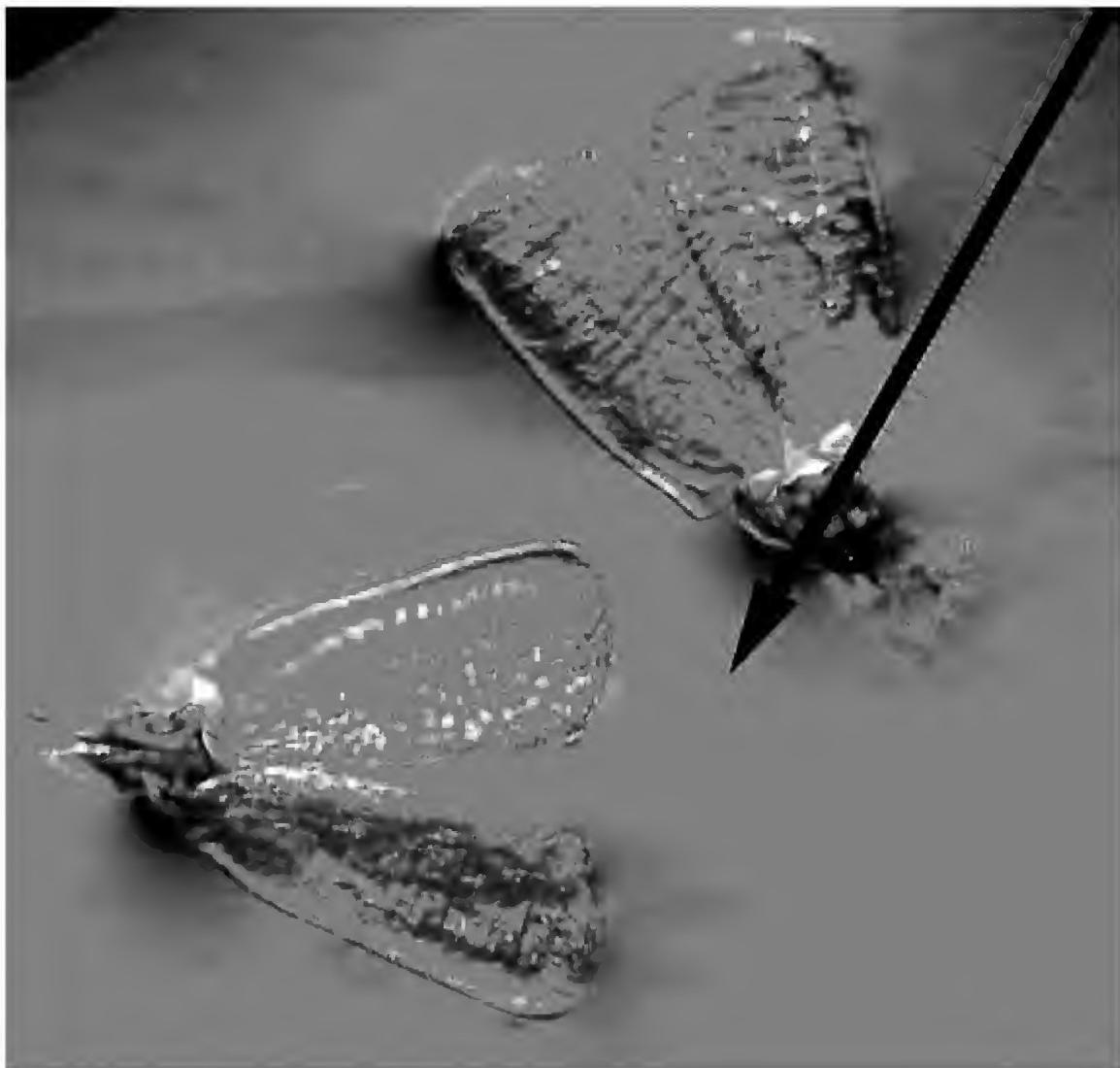
Retinacula character: S



Pollinaria with one pollinium missing enlarged ca. 100x.

Here to show more clearly the shape of the retinaculum here with the pollinium twisted on the axis.

Hoya davidgoyderiae Kloppenburg & Mendoza
(unpublished) GM #44



Pollinaria above enlarged ca.122x.

Pollinium

length	0.43
widest	0.20

Translator

length	0.06
depth	0.02

Retinaculum

length	0.12
shoulder	0.10
waist	0.04
hip	0.05
ext.	0.08

Retinacula character: S

Caudicle

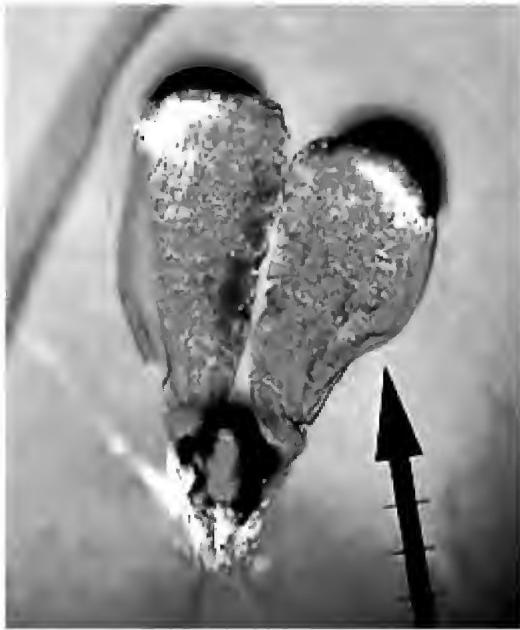
bulb diam.	0.05
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Translator/caudicle type: ls/o

Pollinia inner end type: T

Caudicle bulb: C

Hoya fitchii Kloppenburg 2009



Pollinarium picture taken with a Epson Digital camera taken through the lens of a Bosch & Lomb microscope at 400x magnification. The measurement arrow head is 0.1 mm long as is the distance between lines on the shaft., head is 0.5 mm wide. very sharp focus.

Pollinarium

length	0.43 mm
widest	0.17 mm

Retinaculum

length	0.11 mm
shoulder	0.12 mm
waist	0.07 mm
hip	0.08 mm
ext.	0.05 mm

Ret.:Pol. ratio 1:3.5

Translator

length	0.10 mm
width	0.01 mm

Caudicle

bulb diam.	0.05 mm
------------	---------

Translator/caudicle type: ls/o

Pollinia inner end type: R

Caudicle bulb: G ?

Retinacula character: S

This species has a pollinarium that differs from the type and from Dr. Schlechter's drawing. In his sp. the pollinium are less than twice as long as the retinaculum, in this sp. it is over 3 times longer. The pedicels here are a little shorter, the flower diameter a little less, the calyx less linear, and here the coronal lobes are essentially horizontal, the outer lobes are not raised as in *Hoya cagayanensis*.

Hoya liljebjorniana Kloppenburg & Mendoza
(unpublished) GM #43



Pollinaria enlarged ca. 140x

Pollinarium

length	0.43 mm
widest	0.18 mm

Translator

length	0.10 mm
depth	0.03 mm

Retinaculum

length	0.15 mm
shoulder	0.14 mm
waist	0.06 mm
hip	0.10 mm
ext	0.03 mm

Caudicle

bulb diam.	0.05 mm
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Translator/caudicle type: ls/o

Pollinia inner end type: R

Caudicle bulb: C

Retinacula character: S

***Hoya ralphdavisiae* Kloppenburg, Mendoza & Ferreras 2014**



Pollinaria enlarged 160x.

Pollinium

length	0.43 mm
widest	0.18 mm

Retinaculum

length	0.15 mm
shoulder	0.15 mm
waist	0.07 mm
hip	0.10 mm
ext.	0.07 mm

Translator

length	0.11 mm
widest	0.03 mm

Caudicle

bulb diam.	0.05 mm
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Caudicle is clear
Pollinia ends are tapered.

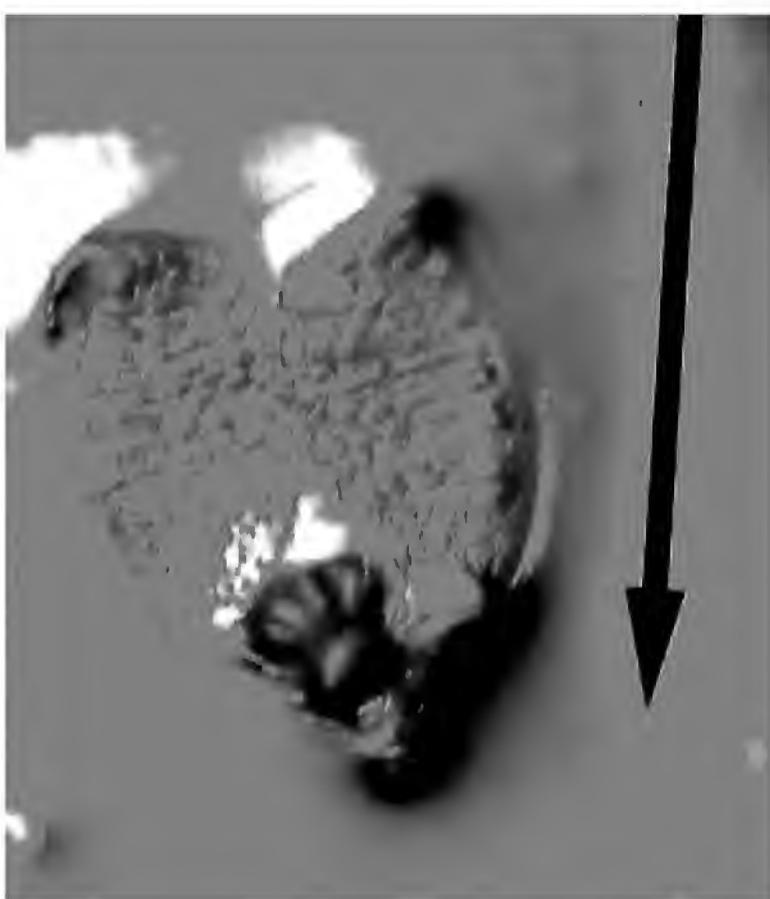
Translator/caudicle type:
ls/o

Pollinia inner end type: F

Caudicle bulb: C

Retinacula character: S

***Hoya blashernaiaeii subsp. maragondonensis* Kloppenburg & Mendoza
(unpublished) GM #99**



Pollinarium enlarged ca.
150x

Pollinium

length	0.43 mm
widest	0.25 mm

Retinaculum

length	0.14 mm
shoulder	0.15 mm
waist	0.08 mm
hip	0.10 mm
ext.	0.02 mm

Translator

length	0.11 mm
wide	0.02 mm

Caudicle

bulb diam.	0.07 mm
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Translator/caudicle: ls/o

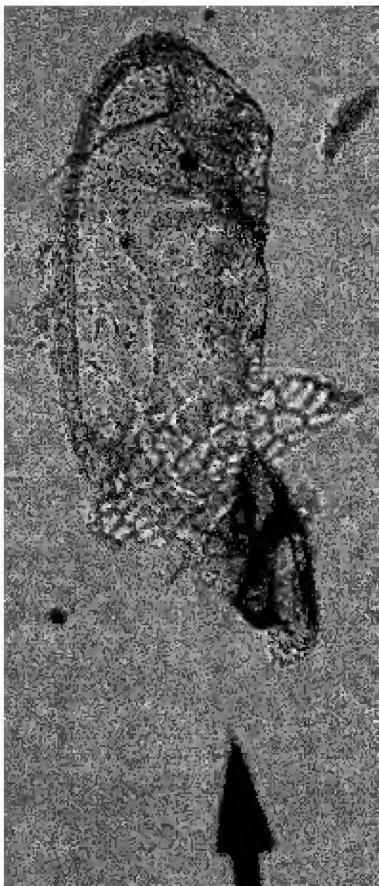
Pollinia inner end type: R

Caudicle bulb: C

Retinacula character: S

The pollinia in some of my photos appear to be slumped on the outer ends, the lower pollinarium seems to have one pollinia (the upper one) that is not slumped, so I use this for measurements.

Hoya opposita G. Don 1837



Pollinarium enlarged about 165x. This is a short, wide pollinia. (A extraneous skin cell? membrane at the base) Retinaculum is turned a little on its side. The arrow below is 1 mm long and the top $\frac{1}{2}$ mm wide for comparison.

Again as in *Hoya verticillata* (Vahl) Don the pollinia is very wide and short, apex truncate, also a wide vacuole.

Pollinia

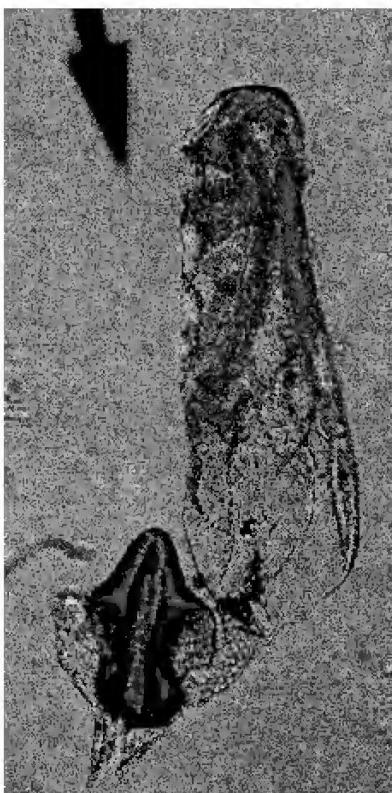
length	0.43 mm
widest	0.16 mm

Retinaculum

length	0.15 mm
shoulder	0.10 mm
waist	0.05 mm
hip	0.07 mm
extensions	0.05 mm

Translator

length	0.07 mm
width	0.02 mm



The retinaculum is very distinct here, translators are fiddle-form and the caudicles are barely visible, covering the end of the pollinia and to the left just visible and translucent. The retinaculum seems to have no differentiated dark extensions but the structure is there below. Shoulder, waist and hip areas clearly discernable.

Translator/caudicle: ls/o

Pollinia inner end type: R

Caudicle bulb: G ?

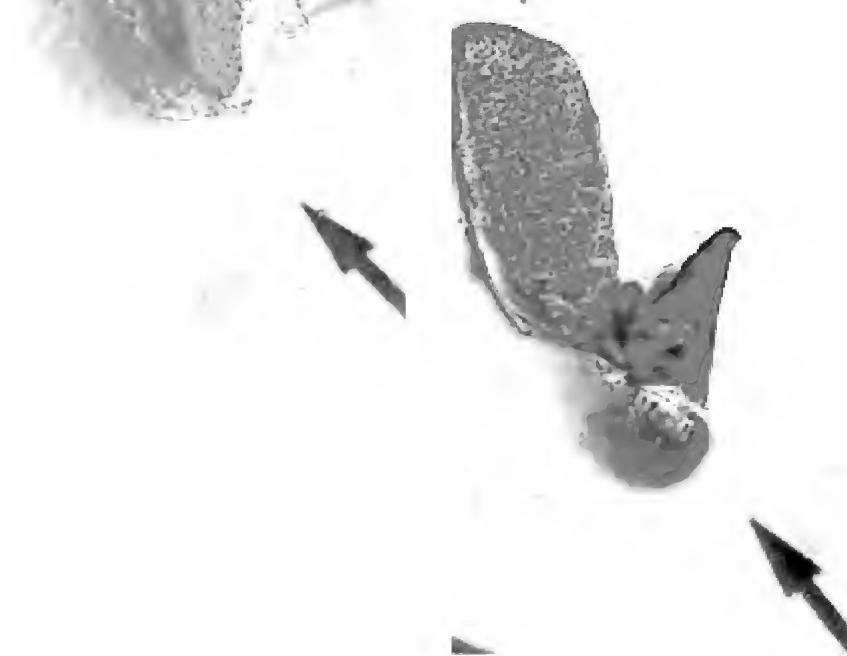
Retinacula character: S

***Hoya vicencioana* subsp. *quezonensis* Kloppenburg 2015
CAHUP 5294, Hernaez
17 March 2000, UP Landgrant, Quezon, Philippines. Photo and data 3/29/99.**



Retinaculum and extensions well developed, inner apex rounded, with translator on left side attached well down on side.

I can not determine measurements as I have no scale showing in photo.

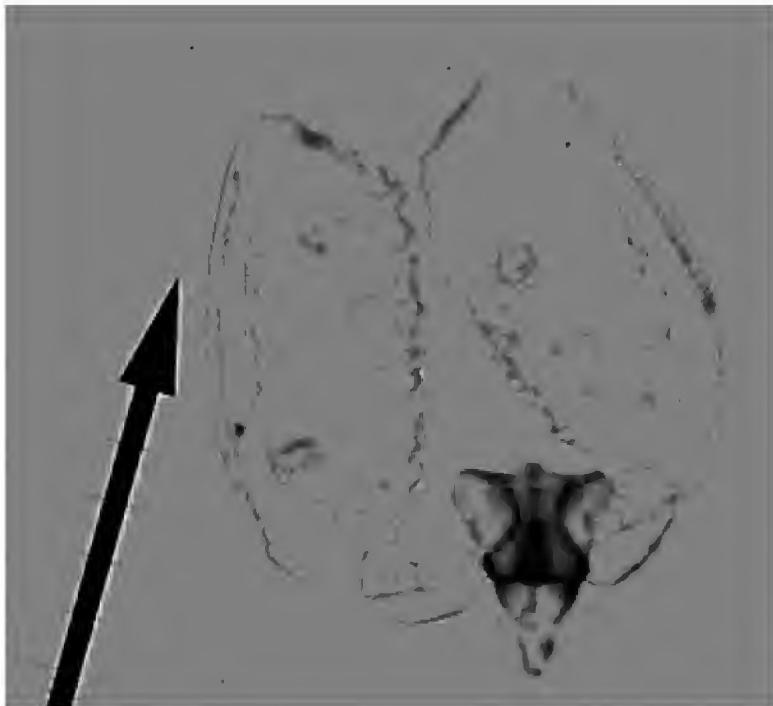


Pollinium has germinated apex rounded inner apex narrowing and also obtuse.

It is 0.42 mm long. and ca. 0.15 mm at the widest.

Another photo of a pollinarium. Here the pollinium seems to measure 0.40 mm long and 0.16 mm at the widest.

Hoya blashernaiaeii subsp. ferrerasiana Kloppenburg & Mendoza
(unpublished) GM #134



Pollinium enlarged ca. 144
x

Pollinium

length	0.42 mm
widest	0.20 mm

Retinaculum

length	0.10 mm
shoulder	0.15 mm
waist	0.09 mm
hip	0.10 mm
ext.	0.06 mm

Translator

length	0.10 mm
widest	0.04 mm

Caudicle

bulb diam.	0.06 mm
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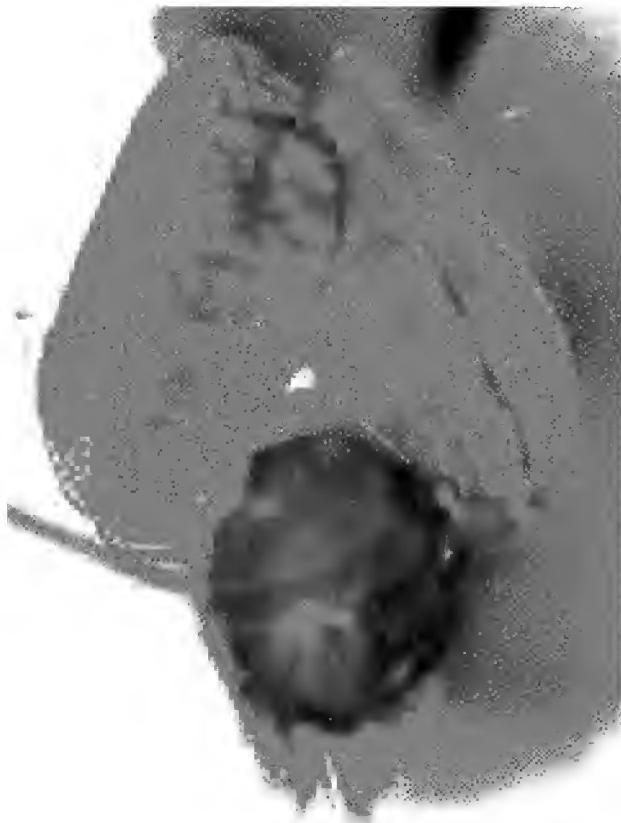
Translator/caudicle type: ls/o

Pollinia apex type: F

Caudicle bulb: C

Retinacula character: S

Hoya pimenteliana Kloppenburg 1999 Type clone



Pollinarium approximately
165x.

Pollinium

length	0.42 mm
widest	0.20 mm

Retinaculum

length	0.24 mm
shoulder	0.20 mm
hip	0.20 mm
ext.	0.11 mm

Translators

length	0.19 mm
depth	0.01 mm

Caudicle

bulb diam.	0.19 mm
------------	---------

Type: G

Translator/caudicle type: ls/o

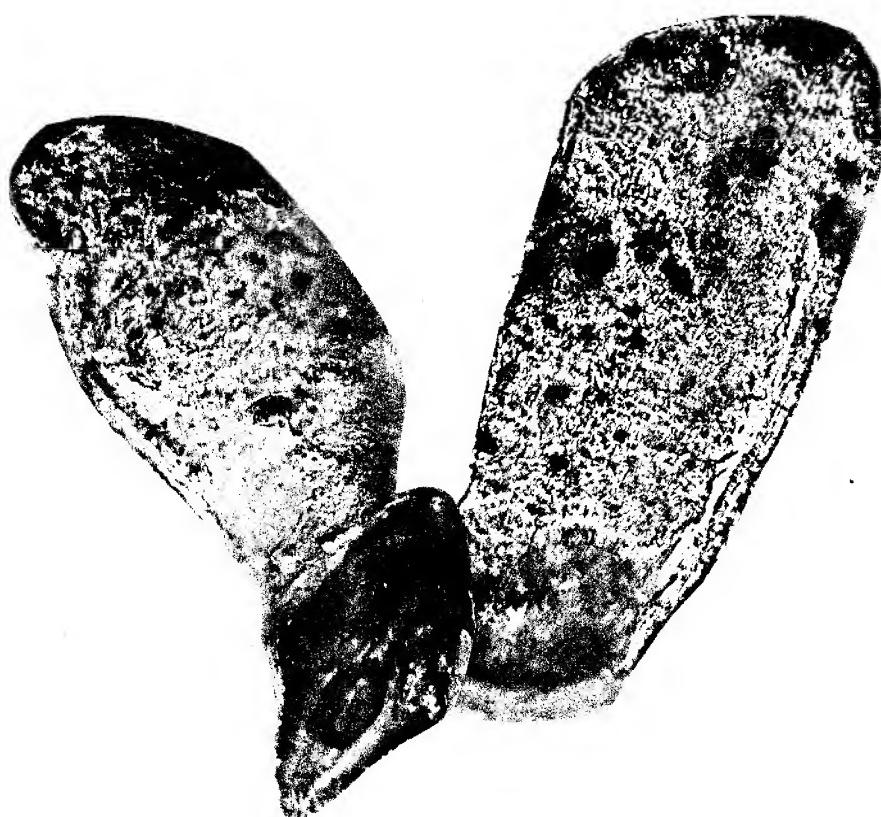
Pollinia apex type: T

Caudicle bulb: G

Retinacula character: LN

Hoya sp. Ramos & Edano 1927 (UC) 49395

Labeled *Hoya fischeriana* Warburg
Mt. Mayo, Mindanao, Philippines.



Magnified approximately 165x.

Pollinium

length: 0.42 mm
widest: 0.18 mm

Retinaculum

length: 0.23 mm
shoulder: 0.15 mm
waist: 0.08 mm
hip: 0.17 mm
ext.: 0.04 mm

Translators

length: 0.18 mm
depth: 0.03 mm

Caudicle

bulb. diam.: 0.09 mm.

Translator/caudicle type: ls/o

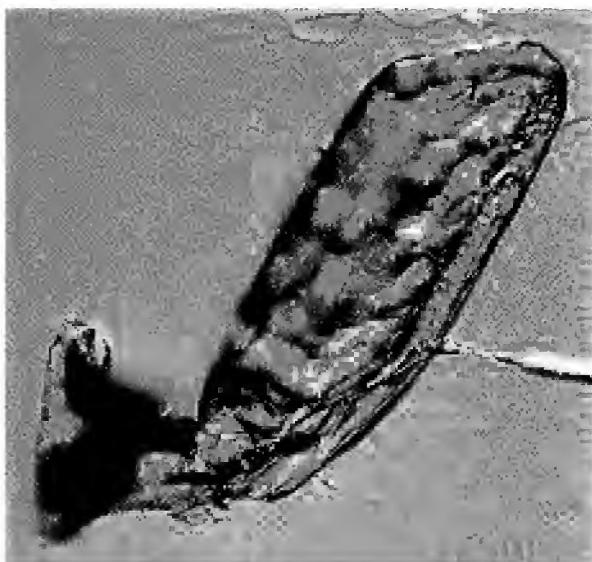
Retinacula character: HE

Pollinia apex type: R

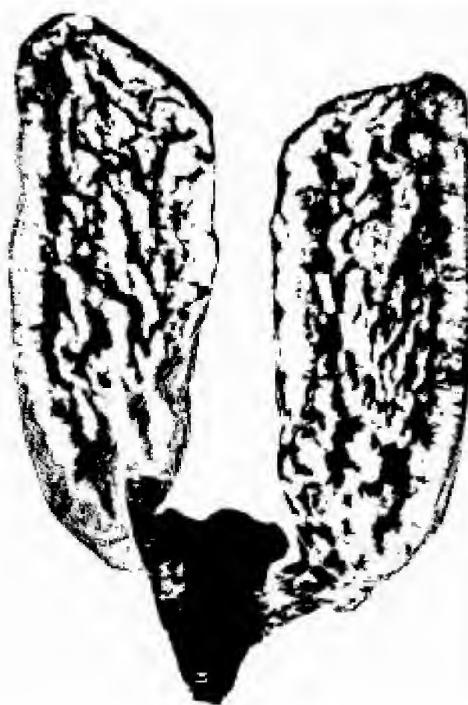
Caudicle bulb: ?

Hoya quinquinervia Warburg 1904

Grown and flowered in Fresno, CA. from clone 81100 JP.



Pollinarium (1/2) which is enlarged approx. 165 times already starting to germinate (note pollen tubes on rt. side and above in background. The pollinia top is tapered inward and broad. Here the broad head of the retinaculum is partially visible and its distinct waist and hip area. The translator (rather narrow) and the caudicle seem to arise from below the Waist.



Pollinium

length:	0.42 mm
widest:	0.16 mm

Retinaculum

length:	0.13 mm
shoulder:	0.10 mm
waist:	0.06 mm
hip:	0.08 mm
ext.:	0.02 mm

Translators

length:	0.09 mm
depth:	0.02 mm

Caudicle

bulb. diam.: 0.05 mm

Magnified approximately 165x.

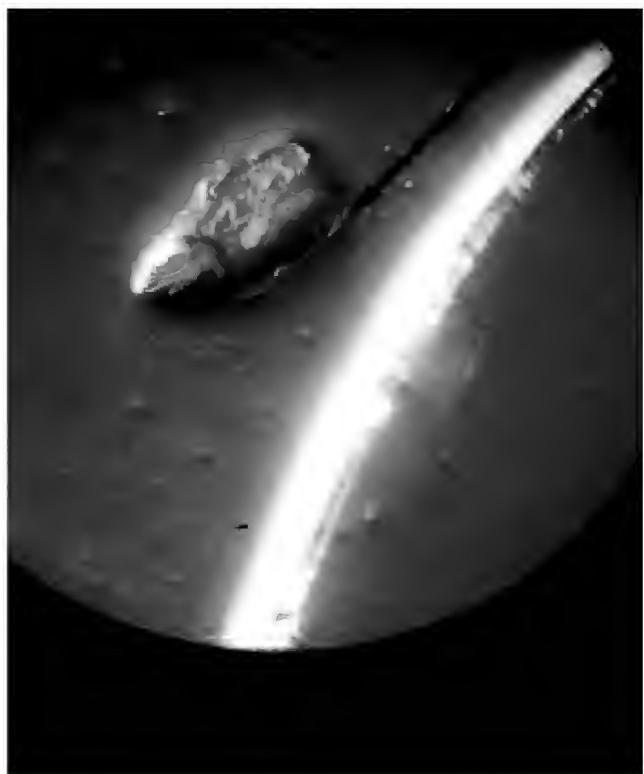
Translator/caudicle type: ls/o

Retinacula character: S

Pollinia apex type: F

Caudicle bulb: G

Hoya vicencioana Kloppenburg, Siar, Cajano, Guevarra &
Carandang 2013 Type clone
ISSN 10055-4564



Pollinarium enlarged ca. 100x

Pollinium

length 0.42 mm
widest 0.15 mm

Retinaculum

length 0.15 mm
shoulder 0.17 mm
waist 0.10 mm
hip 0.15 mm
ext. 0.10 mm

Translator

length ca. 0.10 mm

Caudicle

bulb diam. 0.10 mm

Ratios: p/r 2.8 p/w 2.8

Translator/caudicle type: ls/o ?

Pollinia inner apex type: R

Caudicle bulb: ?

Hoya bacunganensis Kloppenburg 2014
Hoya sp. 349 (PNH)

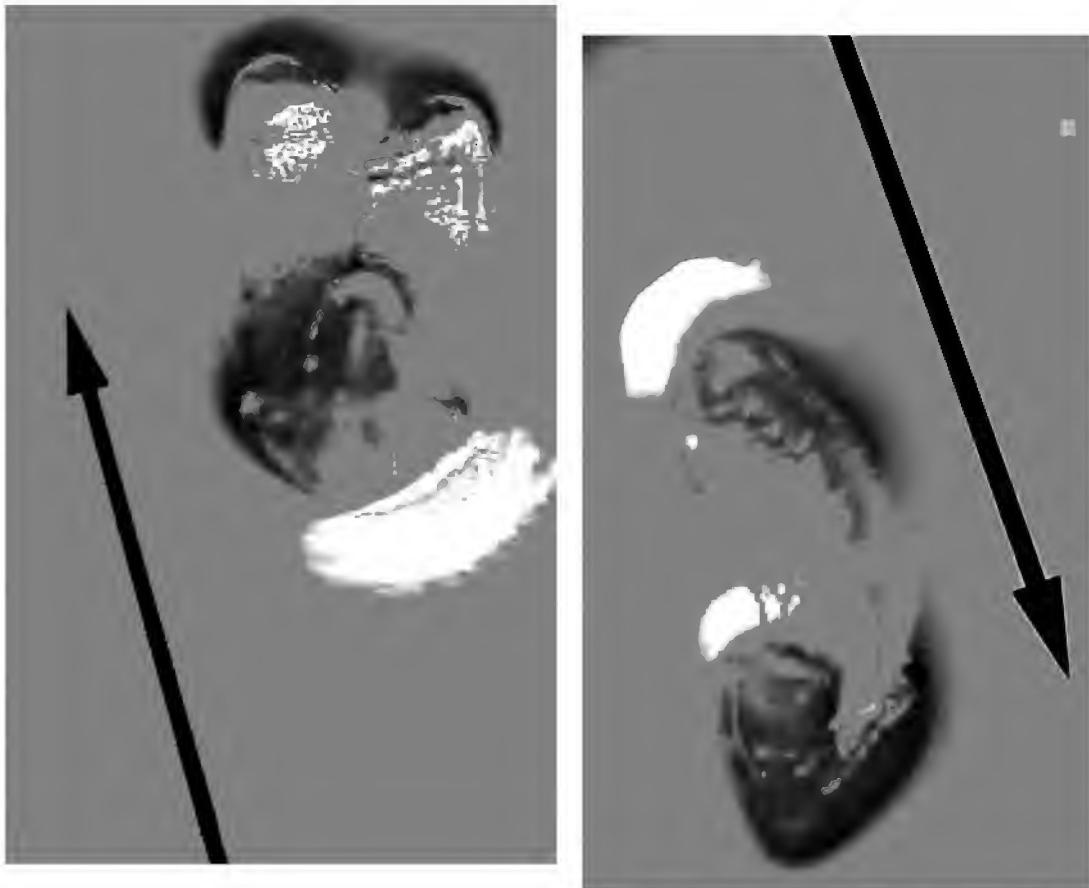
Collected by G. E. Edano, Bacungan, Puerto Princessa, Palawan, Philippines 28 Mar. 1947. Notations. Found on tree trunk in forest at seal level.



Pollinarium
enlarged about 165x.

Pollinium		Translator/caudicle type: ls/o ?
length	0.41 mm	
widest	0.19 mm	Pollinia type: E
Retinaculum		Retinaculum Type: R
length	0.21 mm	
shoulder	0.11 mm	
waist	0.09 mm	
hip	0.10 mm	
ext	0.03 mm close bifid apex	
Translators	very short and tight.	Caudicle bulb diam 0.04 mm ca.
length	0.11 mm	
depth	0.02 mm	

Hoya nuevaensis Kloppenburg & Mendoza
(unpublished) GM #108



Pollinaria enlarged (left) 110x and (right)
130x.

Pollinium

length	0.41 mm
widest	0.18 mm

Translator

length	0.17 mm
wide	0.08 mm

Retinaculum

length	0.18 mm
shoulder	0.12 mm
waist	0.10 mm
hip	0.12 mm
ext	0.05 mm

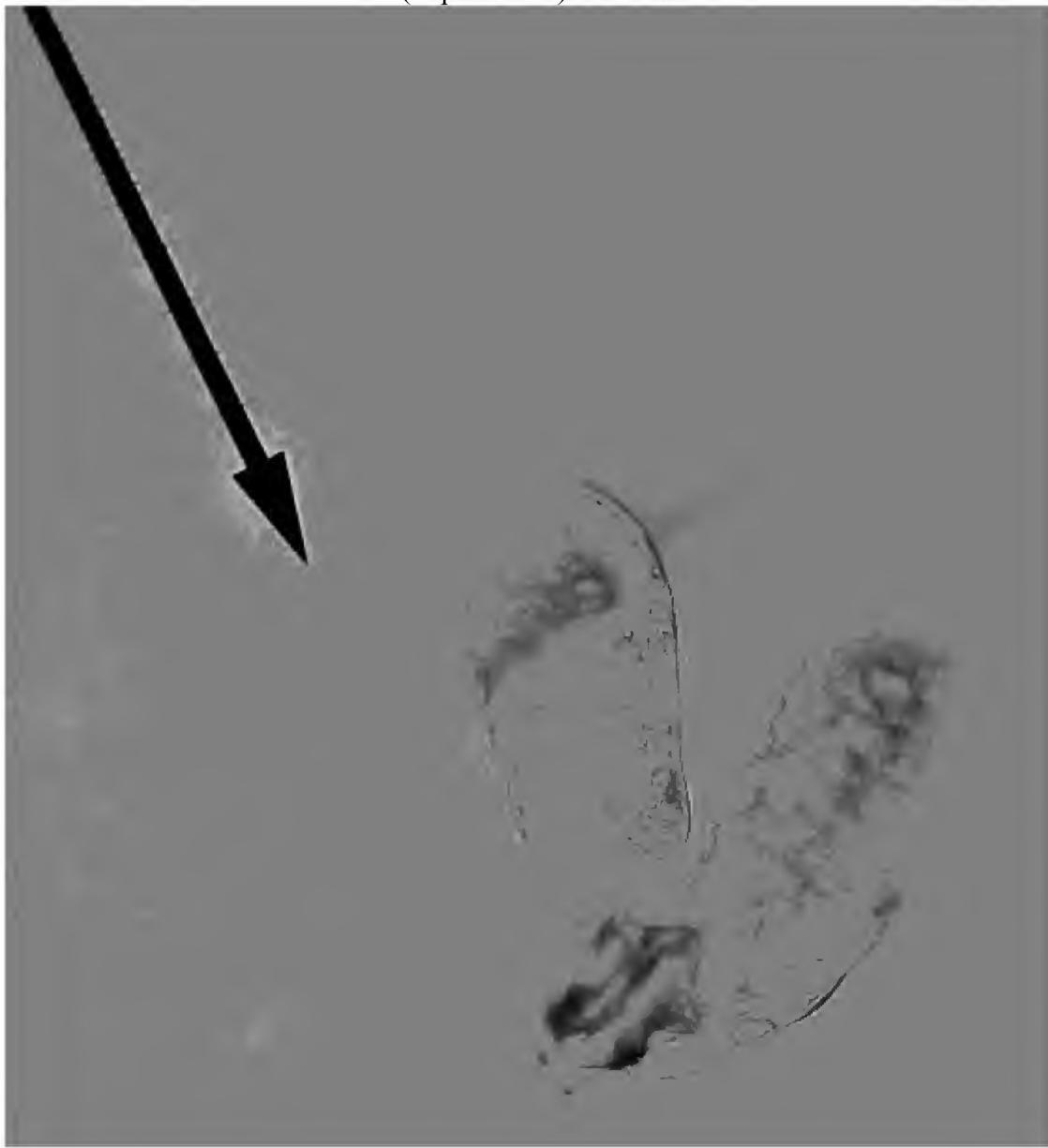
Translator/caudicle type: ls/o

Pollinia inner ends: R

Caudicle bulb: G ?

Retinacula type: S

Hoya inawaensis Kloppenburg & Mendoza
(unpublished) GM #156



Pollinarium enlarged 158x.

7Pollinia

length	0.40 mm
widest	0.19 mm

Translator

length	0.10 mm
wide	0.03 mm

Caudicle bulb diameter 0.05 mm

Retinaculum

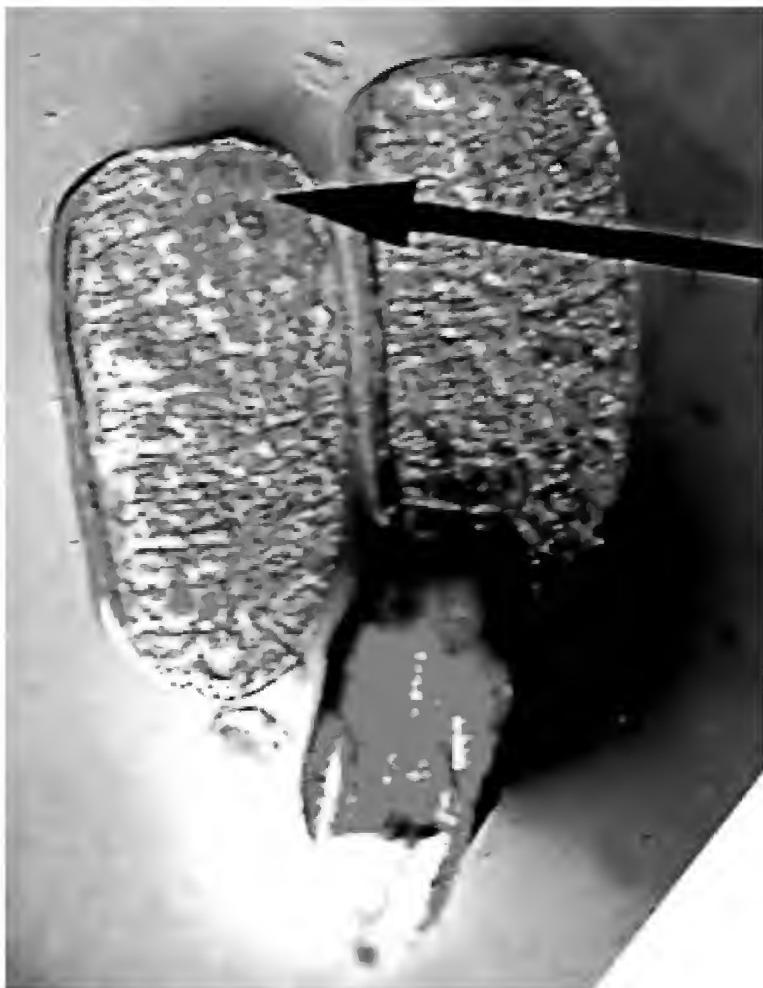
length	0.12 mm
shoulder	0.13 mm
waist	0.07 mm
hip	0.09 mm
ext.	0.05 mm

Pollinia inner apex type: R

Retinacula character: S

Translator/caudicle type: ls/o

***Hoya heuschkeliana* subsp. *cajanoae* Kloppenburg & Siar 2007**
Type clone



Pollinaria enlarged about
165x.

Pollinia inner apex type: R

Translator/caudicle type:
ls/o

Retinacula character: LN

Pollinium

length	0.40 mm
widest	0.21 mm

Retinaculum

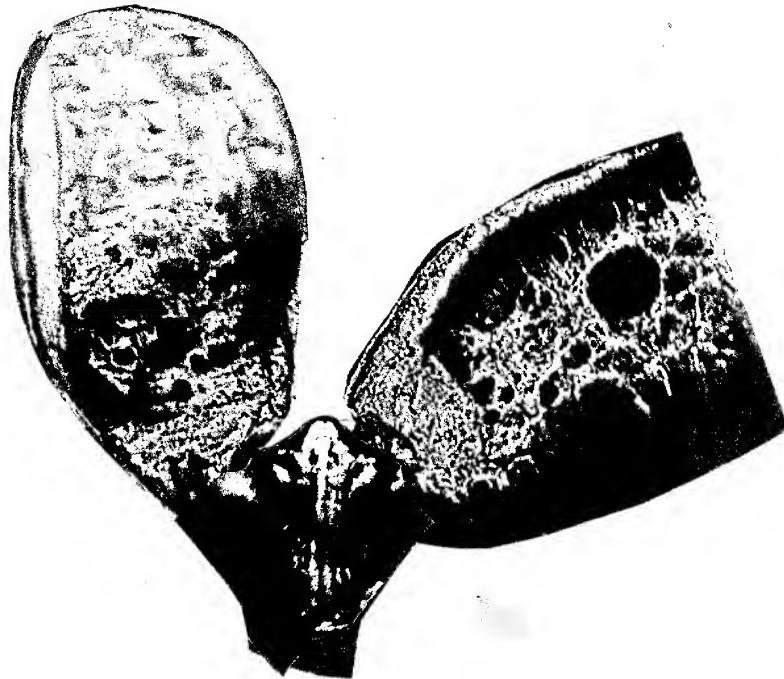
length	0.20 mm to extensions
widest	0.14 mm
ext.	0.07 mm

Translators

length	0.10 mm
depth ca.	0.05 mm

Caudicle **Type:** Clear
bulb diam. 0.07 mm as near as I can determine.

Hoya bordenii Schlechter 1906
Clone UC 15829, 1916 Irosin, Sorsegon, Luzon Philippines.



Magnified
approximately 165x.

Pollinium

length: 0.40 mm
widest: 0.24 mm

Retinaculum

length: 0.16 mm
shoulder: 0.12 mm
waist: 0.07 mm
hip: 0.08 mm
ext.:

Translators

length: 0.11 mm
depth: 0.03 mm

Caudicle

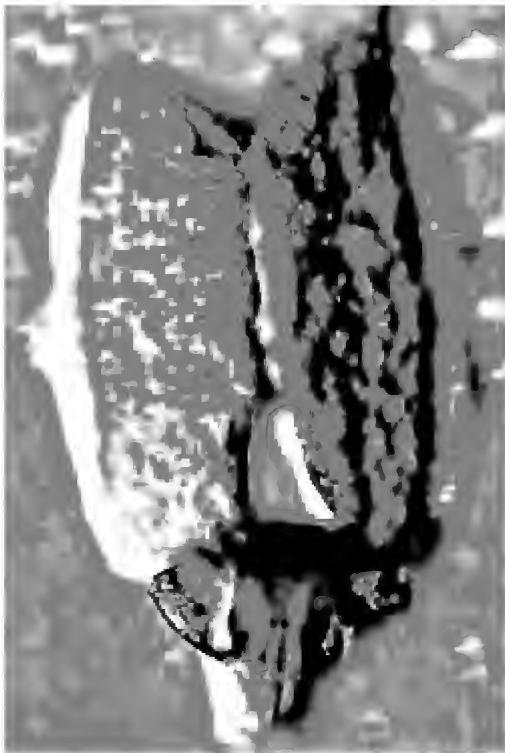
bulb. diam.: 0.05 mm

Pollinia inner apex type: R

Retinacula character: S

Translator/caudicle type: ls/o

Hoya macgregorii Schlechter 1906
Clone PNH 15541, Edano 1952, Mt. Katanglad, Samar, Philippines.



Magnified approximately 165x.

Pollinarium enlarged about 165x.
Note that this species has horns on the head.

Pollinia

length	0.40 mm
widest	0.15 mm

Retinaculum

length	0.15 mm overall
Shoulder	0.12 mm
waist	0.10 mm
hip	0.10 mm +
ext.	0.07 mm

Translator

length	0.08 mm
depth	0.02 mm

Caudicle

bulb diam.	0.04 mm
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Type: G

Pollinia inner apex type: F

Translator/caudicle type: ls/o

Caudicle bulb: G

Retinacula character: HU

Hoya inconspicua Hemsley 1894

Source clone personally collected from Honiara Botanical Garden
Guadalcanal, Solomon Islands 1988.



Pollinarium enlarged about 165x. The apex of the pollinia are truncate, sloping inward. The caudicles are extremely large with narrow translators. See the inner apex stuck into the clear caudicles (apex showing through).The retinacula has large hip area and short widely separated extensions.

Pollinia inner apex type: F

Translator/caudicle type: l/o

Caudicle bulb: C

Retinacula character: E ?

Note the translator/caudicle type is intermediate ie. transitional characters caudicles almost cw type

Pollinia

length	0.40 mm
widest	0.15 mm

Retinaculum

length	0.10 mm
shoulder	0.04 mm
waist	0.03 mm
hip	0.07 mm
extensions	0.03 mm

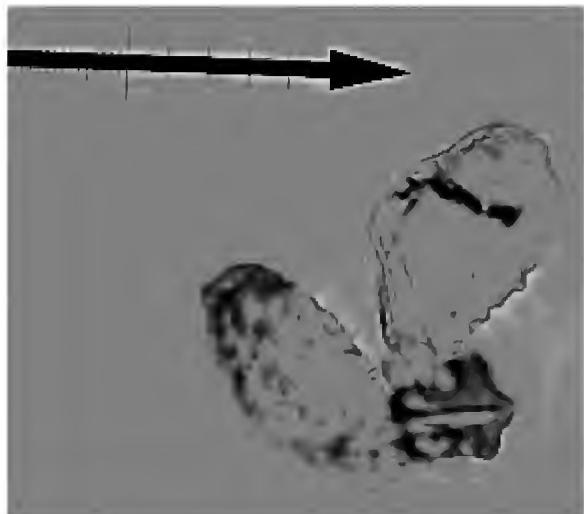
Translator

length	0.17 mm
depth	0.03 mm

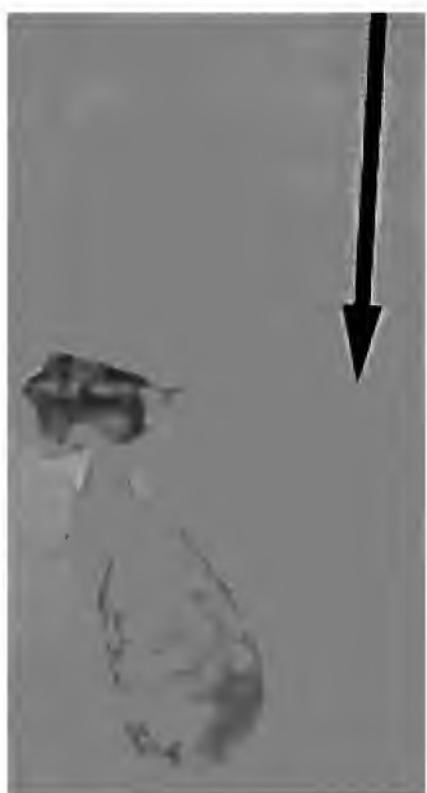
Caudicle

bulb diam.	0.07 mm
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***Hoya blashernaezii* subsp. *carnea* Kloppenburg & Cajano**
(unpublished) AC #3



Two photos of the pollinia as best as I could get from 2 flowers. The top one enlarged about 110x; lower one less. The top photo shows the retinaculum best and the lower one the pollinarium



Pollinium

length	0.40 mm
widest	0.22 mm

Retinaculum

length	0.15 mm
shoulder	0.13 mm
waist	0.08 mm
hip	0.10 mm
ext.	0.05 mm

Translator

length	0.07 mm
wide	0.04 mm

Caudicle

bulb diam.	0.05 mm
------------	---------

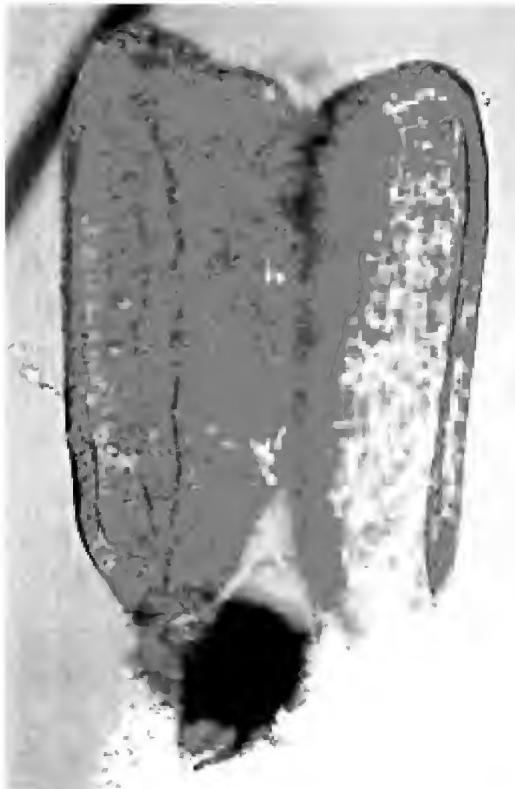
Translator/caudicle type: ls/o

Pollinia inner end type: R

Caudicle bulb: C

Retinacula character: S

***Hoya nuuuliensis* Kloppenburg & Siar 2008**



Pollinarium enlarged about 150x.

Pollinia

length	0.40 mm
widest	0.22 mm

Retinaculum

length	0.13 mm
shoulder	0.11 mm
waist	0.09 mm
hip	0.10 mm
ext.	0.05 mm

Translator

length	0.10 mm
depth	0.05 mm

Caudicle

bulb diam.	0.07 mm
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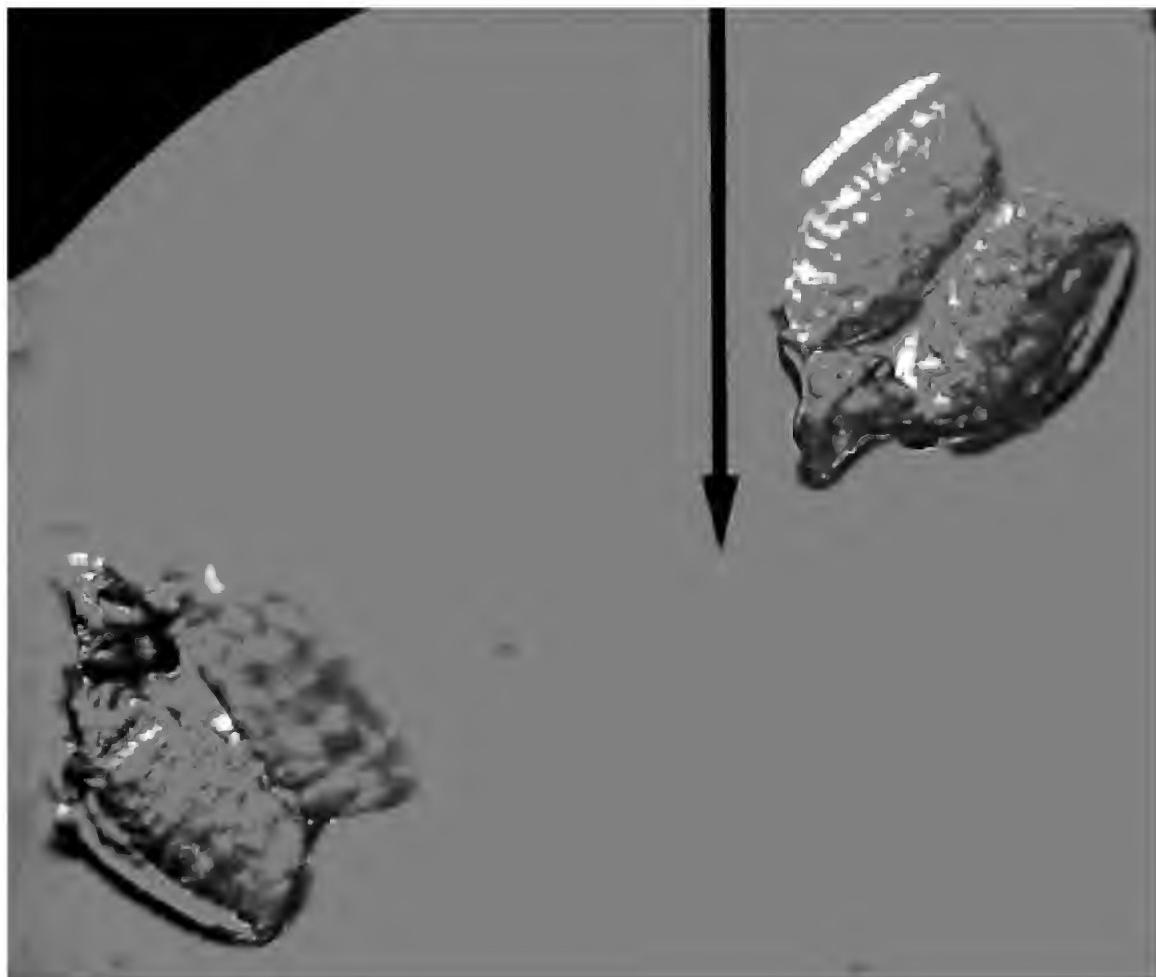
Translator/caudicle type: ls/o

Pollinia inner end type: RF

Caudicle bulb: G

Retinacula character: S

***Hoya blashernaiaeii* subsp. *eudaimononia* Kloppenburg & Mendoza
(unpublished) GM #68**



Pollinaria enlarged ca. 100x.

Pollinium	
length	0.40 mm
widest	0.20 mm

Caudicle	
bulb diam	0.03 mm

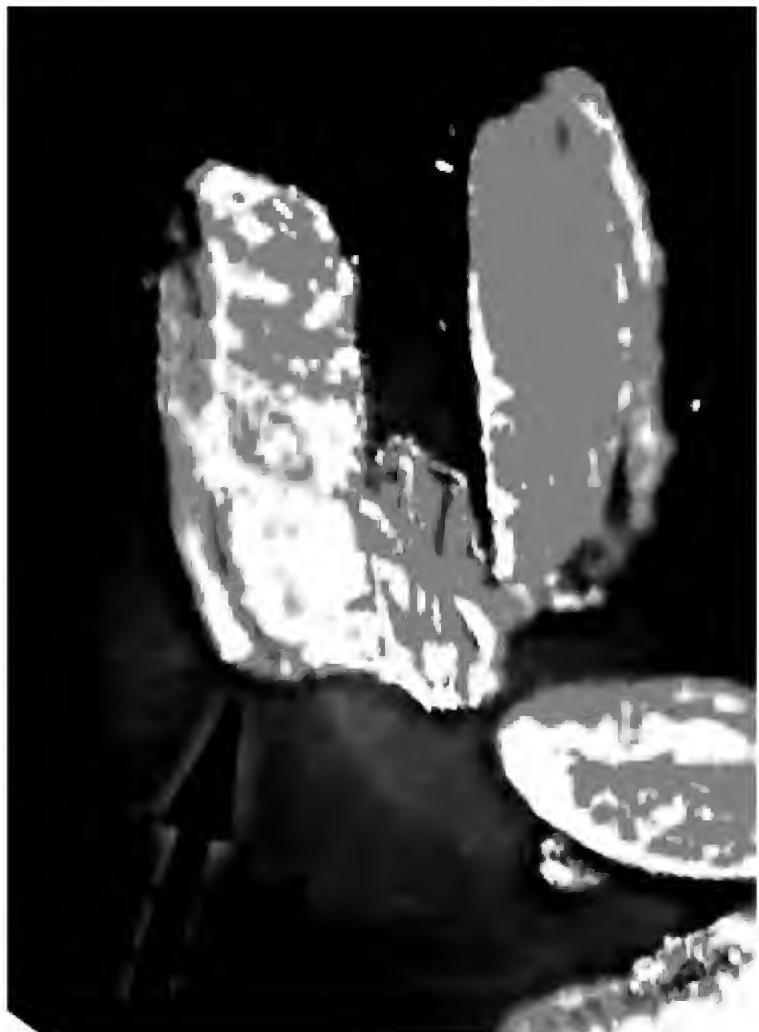
Retinaculum	
length	0.15 mm
shoulder	0.15 mm
waist	0.05 mm
hip	0.06 mm
ext	none ?

Retinacula character: S
Translator/caudicle type: ls/o
Pollinia end type: F
Caudicle bulb: G

Translators	
length	0.05 mm

Hoya sp. PNH 11591 as H. incrassata

Not correct



Pollinarium enlarged about 155x.

Pollinium

length	0.40 mm.
widest	0.15 mm.

Retinaculum

length	0.17 mm.
shoulder	0.15 mm.
waist	0.06 mm.
hip	0.10 mm.
ext.	0.05 mm.

Translators

length	0.05 mm.
depth	0.03 mm.

Caudicle

bulb diam. 0.06 mm.

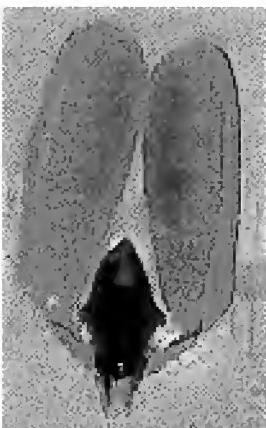
Translator/caudicle type:
ls/o

Pollinia inner end type: T

Retinacula character: LS

Hoya sp. affinis australis #941135

Balasiki Island, Central Sulawesi



Pollinarium enlarged about 39x. This is near the pollinaria found in *H. australis* with some minor differences, it is definitely related to this complex, however the coronal processes are entirely different in many ways. Here the extensions on the retinaculum are for the most part more deeply divided.

Pollinium

length	0.40 mm
widest	0.17 mm

Retinaculum

length	0.16 mm
shoulder	0.11 mm
waist	0.08 mm
hip	0.09 mm
extensions	0.07 mm. visible to 0.14 mm

Translators

length	0.13 mm
depth	0.02 mm
width ca.	0.01 mm

Caudicle

bulb diam.	0.05 mm
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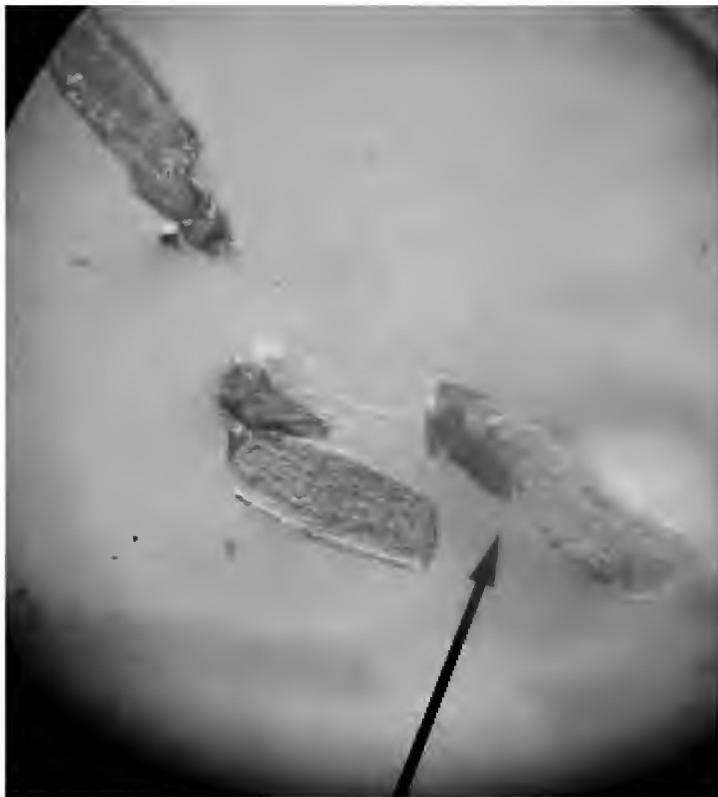
Translator/caudicle type: ls/o

Pollinia apex type: R

Caudicle bulb: ?

Retinacula character: HE

Hoya historia Kloppenburg 2015
sp. CAHUP #5292



Above pollinarium greatly enlarged. See scale for measurements. Black arrow head is 0.1 mm long base 0.05 mm wide. main markings on stem also 0.5 cm intervals .

Pollinaria

length	0.40 mm
widest	0.15 mm

Retinaculum

length	0.19 mm
shoulder	0.06 mm
waist	0.04 mm
hip	0.08 mm
ext.	0.02 mm

Translator

length	0.15 mm
depth	0.02 mm

Caudicle

bulb diam.	0.07 mm
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Translator/caudicle type: ls/o

Pollinia inner end type: T

Caudicle bulb: C

Retinacula character: E

Hoya verticillata (Vahl) G. Don 1837

Type specimen:

Retinaculum enlarged about 165x.



length	0.18 mm
shoulder	0.10 mm
waist	0.05 mm
hips	0.06 mm
extensions	0.05 mm or maybe none.

Translators

length	0.05 mm
depth	0.04 mm



Pollinia enlarged about 165x.

Remember this is from a plant probably mounted in 1804, so it is nearly 200 years old. Here it is a bit distorted but we can see there is a rather wide vacuole in from the pellucid edge and the pollinia is rather wide for its length.

length	0.39 mm
widest	0.18 mm

I suppose the pollinia actually may measure slightly longer. All the measurements here are smaller than any of the *Hoya acuta* Haw. group, that I have grown or collected and studied. Data on all pollinaria will be presented further on. The Pollinarium measurements fit no other known hoya species familiar to me.

Translator/caudicle type: Probably ls/o

Pollinia inner apex type: T

Caudicle bulb: G ?

Retinacula character: S

***Hoya indaysarae* M. N. D. Medina, R. J. T. Villanueva, R. D. Kloppenburg & A. Cabras**

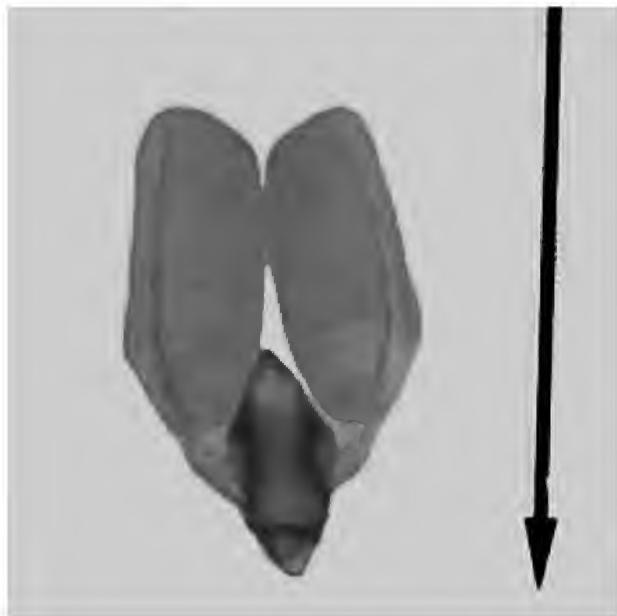


Fig. 7 Pollinia
Pollinium
Length 0.39 mm
Widest 0.11 mm

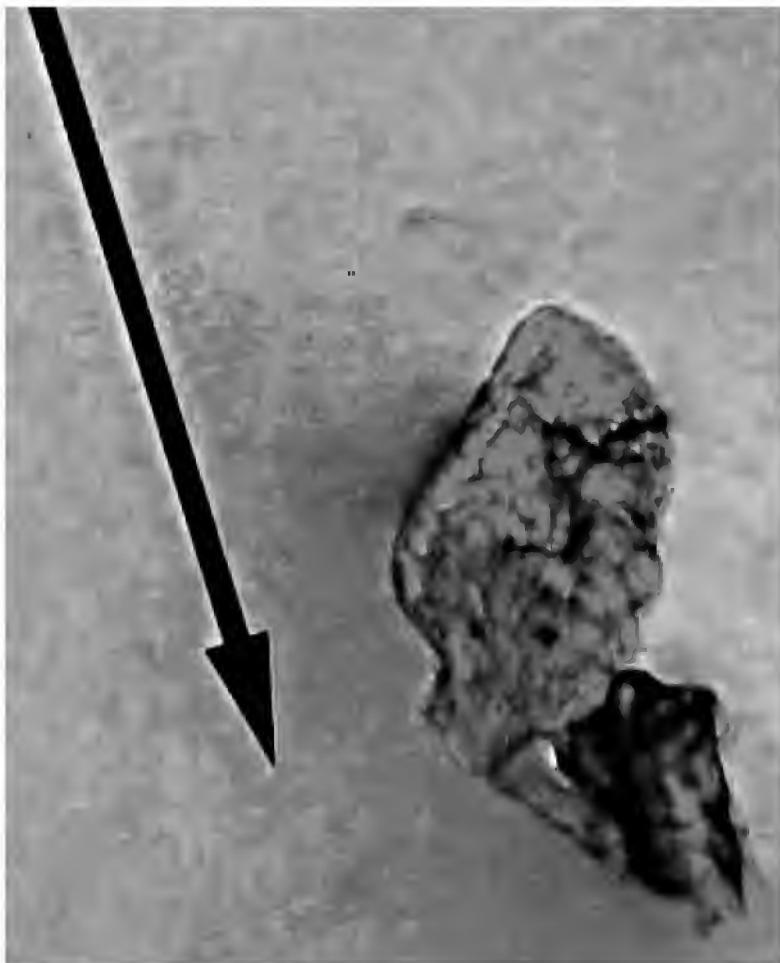
Retinaculum
Length 0.21 mm
Widest 0.13 mm

Translator/caudicle Type: ls/o

Ret type: HE

Retinaculum has a long rounded head, tapering to the shoulder area then slightly curved inward with short extensions.

***Hoya blashernaezii* subsp. *aurantiaca* Kloppenburg & Mendoza**
(unpublished)



Pollinaria enlarged ca.
180x.

Pollinium

length	0.38 mm
widest	0.20 mm

Retinaculum

length	0.16 mm
shoulder	0.15 mm
waist	0.09 mm
hip	0.10 mm
ext.	0.05 mm

Translator

length	0.15 mm
wide	0.04 mm

Caudicle

bulb diam.	0.05 mm
------------	---------

Translator/caudicle: ls/o

Pollinia inner end: R

Retinacula: S

Hoya lasiantha Korthals ex Blume 1848

Flower via Torill Nyhuus, Sweden.

Pollinarium, long tapering head, shoulder and waist not well defined; hip with curved edges rounded inwardly near waist. Extensions curved outward and very narrow.

This is a photomicrograph of a flower sent by Torill Nyhuus. The pollinia are slightly shriveled from being in alcohol. Note however that there is a narrow distinct translator that widens as it nears the retinaculum. The clear caudicles are rather large. The

vacuoles are rather large. Distinctive are the two dark sharp pointed extensions that arise from the top of the retinaculum and point inward. I have observed this only in one other hoya species (*Hoya phyllura* Swartz) and they're not as distinct.



Pollinium

length	0.38 mm
widest	0.13 mm

Retinaculum

length	0.19 mm
shoulder	0.08 mm
waist	0.07 mm
hip	0.08 mm
extensions	0.03 mm

Translators

length (curved)	0.09 mm
depth	0.01 mm

Caudicles

bulb diameter	0.05 mm
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Translator/caudicle type: ls/o

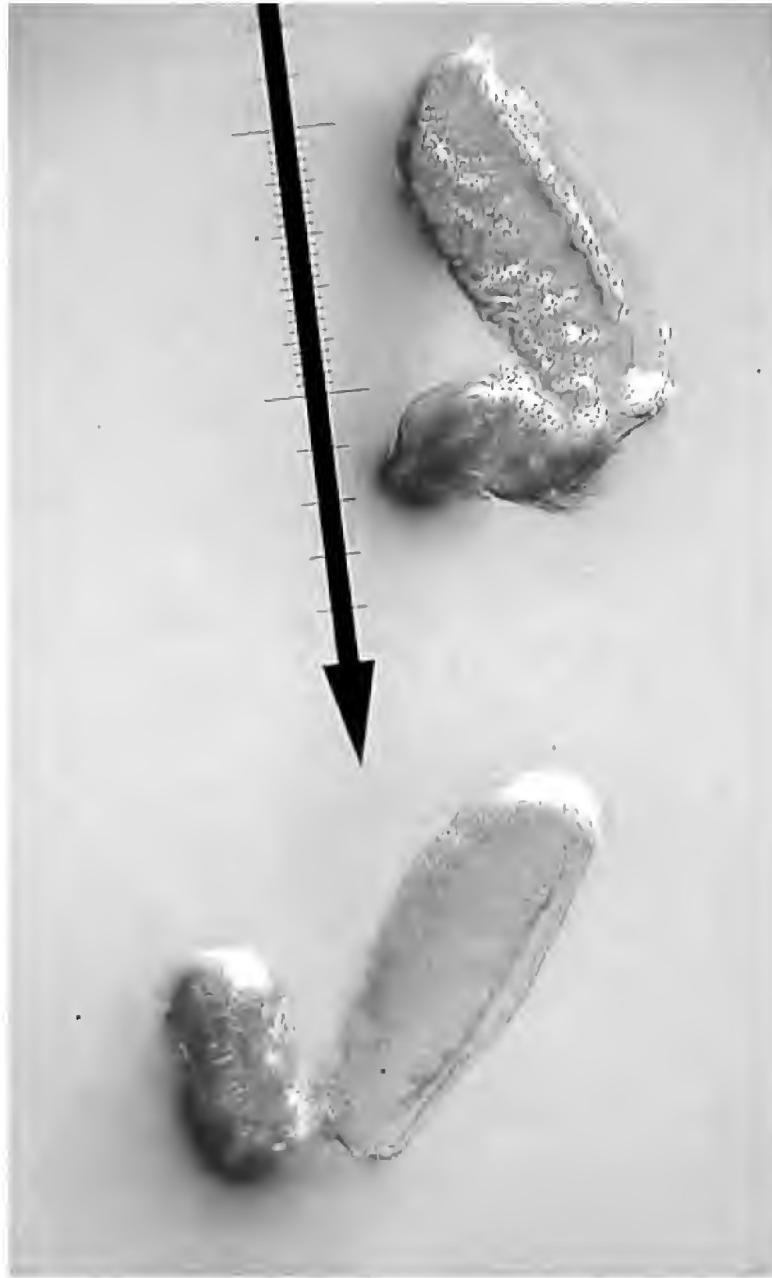
Pollinia inner apex type: R

Caudicle bulb: G

Retinacula character: LS

***Hoya maximowayetii* Kloppenburg 2014**

CAHUP 5271 Collected by Maximo Wayet at Benguet Village, Querino, Luzon,
Philippines
Photos 19 April 2006



Pollinaria both with one pollinium missing and retinaculum twisted a little on both. Head of arrow is 0.1 mm long.

Pollinium

length	0.38 mm
widest	0.15 mm

Retinaculum

length	0.16 mm
shoulder	0.13 mm
hip	0.04 mm
waist	0.05 mm
ext.	0.04 mm

Measurements of the retinacula are close approximations. Can not determine length of the translators, although they are short, nor the caudicle bulb diameter.

Ratio: Re. to Pollinium 1:1.7

Translator/caudicle type: ls/o

Pollinia inner apex type: T

Caudicle bulb: ?

Hoya baguioensis Kloppenburg 2017

CAHUP 5270

Photographed on 5/20/06 at Fresno, CA. Collected by Maximo Wayet at Baguio Village, Querino, elev. 150m, 6 Jan. 1990. Leaf large palmate, 18 x 2.3 cm. petiole .27 cm. grooved above. Peduncle 2.0 cm. with double rachis 0.2 cm. long.



Pollinarium
enlarged about
165x.

One retinaculum
turned on the axis
but I was able to
find a second
retinaculum.

Pollinium
length 0.37 mm
widest 0.14 mm

Retinaculum
length 0.16 mm
shoulder 0.12 mm
waist 0.06 mm
hip 0.08 mm
ext. 0.05 mm

Translator
length 0.11 mm
depth 0.04 mm

Caudicle
Bulb diam 0.05mm.

Translator/caudicle type: ls/o ?

Pollinia inner apex type: RT

Caudicle bulb: ?

Retinacula character: HU/RT

Hoya sp. PNH 39370 Quisumbing 1957
From Mona's Garden, Manila, Philippines.

Magnified approximately 165x.



Pollinium

length: 0.37 mm
widest: 0.16 mm

Retinaculum

length: ca. 0.12 mm
shoulder: 0.11 mm
waist: 0.06 mm
hip: 0.10 mm
ext.: 0.02 mm

Translators

length: 0.11 mm
depth: 0.01 mm

Caudicle

bulb. diam.: 0.06 mm

Translator/caudicle type: ls/o

Pollinia inner apex type: R

Caudicle bulb: ?

Hoya mata-ole-afiensis Kloppenburg 2015

W 2643

Collected by Dr. Art Whistler Savai'i, Samoa 3 June 1975, elevation 1550 m. Flowers white

Pollinarium and second retinaculum enlarged about 165x. The inner edges of the pollinia are a little shriveled. The translators are long cupped on top, the caudicle is small: both enter the retinaculum at the waist area. the extensions are long.



Pollinia

length	0.37 mm
widest	0.18 mm

Retinaculum

length	0.15 mm
shoulders	0.12 mm
waist	0.05 mm
hip	0.08 mm
extensions	0.05 mm

Caudicle

bulb diameter 0.04 mm

Translator/caudicle type: ls/o

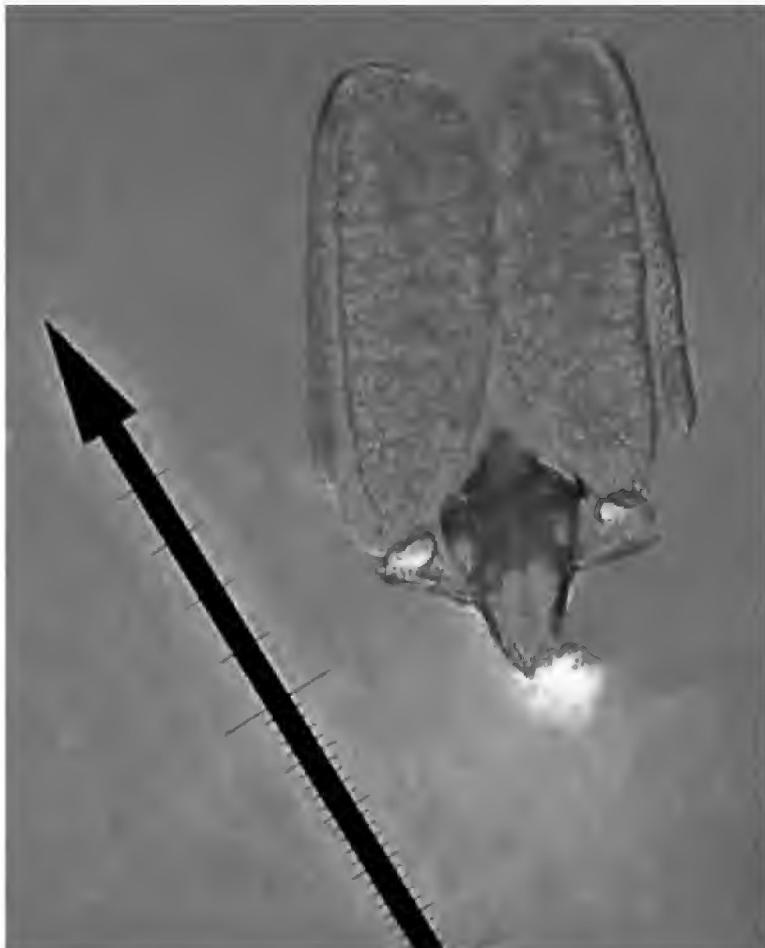
Pollinia inner apex type: F

Caudicle bulb: G

Retinacula character: S

W 2643 3 June 1957. As shown *Hoya filiformis* Reich, relabeled *H. beitchei* Schltr. Ded. 1990. Possibly *H. filiformis*

***Hoya coronarosea* Kloppenburg & Mendoza**
(unpublished)



Pollinaria enlarged ca.
150x.

Pollinium

length	0.37 mm
widest	0.15 mm

Retinacula

length	0.18 mm
shoulder	0.16 mm
waist	0.08 mm
hip	0.09 mm
ext	0.08 mm

Translator

length	0.10 mm
wide	0.01 mm

Caudicle

bulb diam.	0.04 mm
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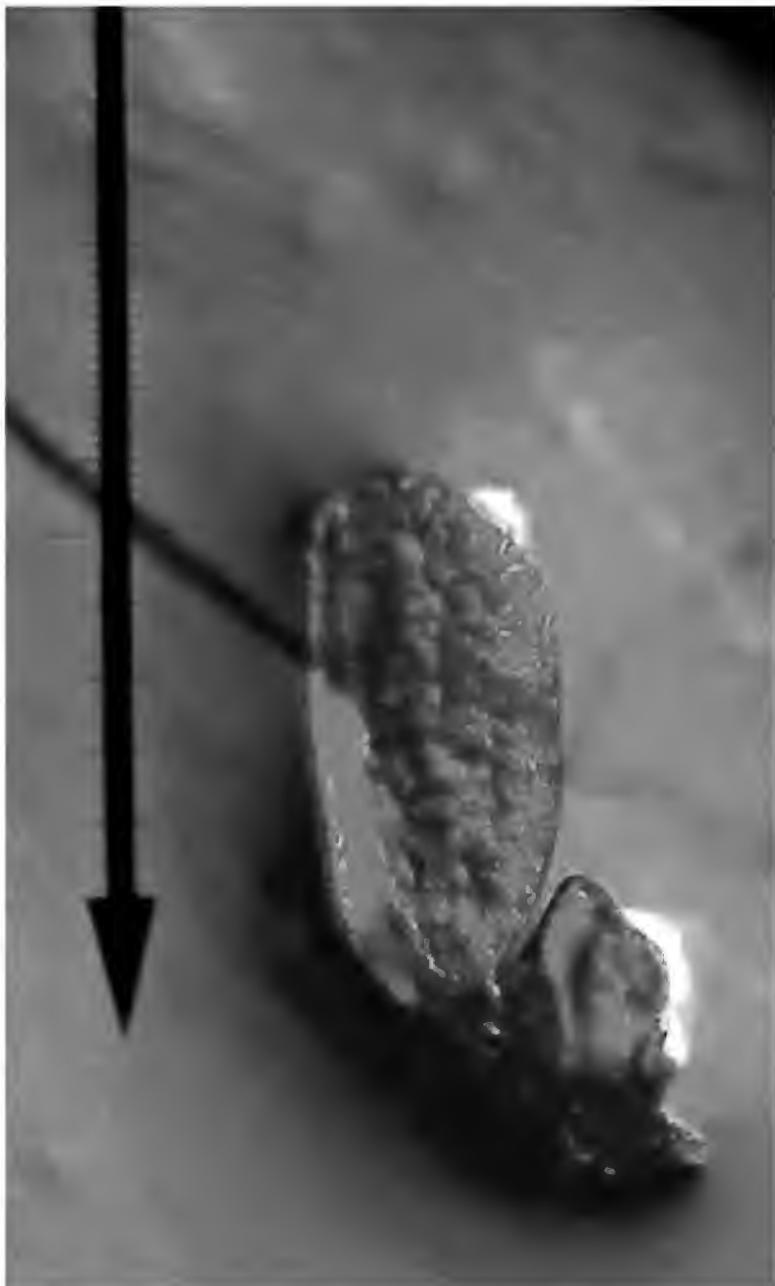
Translator/caudicle type:
ls/o

Pollinia inner ends: R

Retinacula: S

Caudicle: C

Hoya multisepala Kloppenburg & Mendoza
(unpublished) GM #97



Pollinarium enlarged ca.
180x.

Pollinarium

length	0.37 mm
widest	0.18 mm

Retinaculum

length	0.16 mm
shoulder	0.14 mm
waist	0.10 mm
hip	0.14 mm
ext.	0.03 mm

Translator

length	0.10 mm
depth	0.02 mm

Caudicle

bulb diam.	0.05 mm
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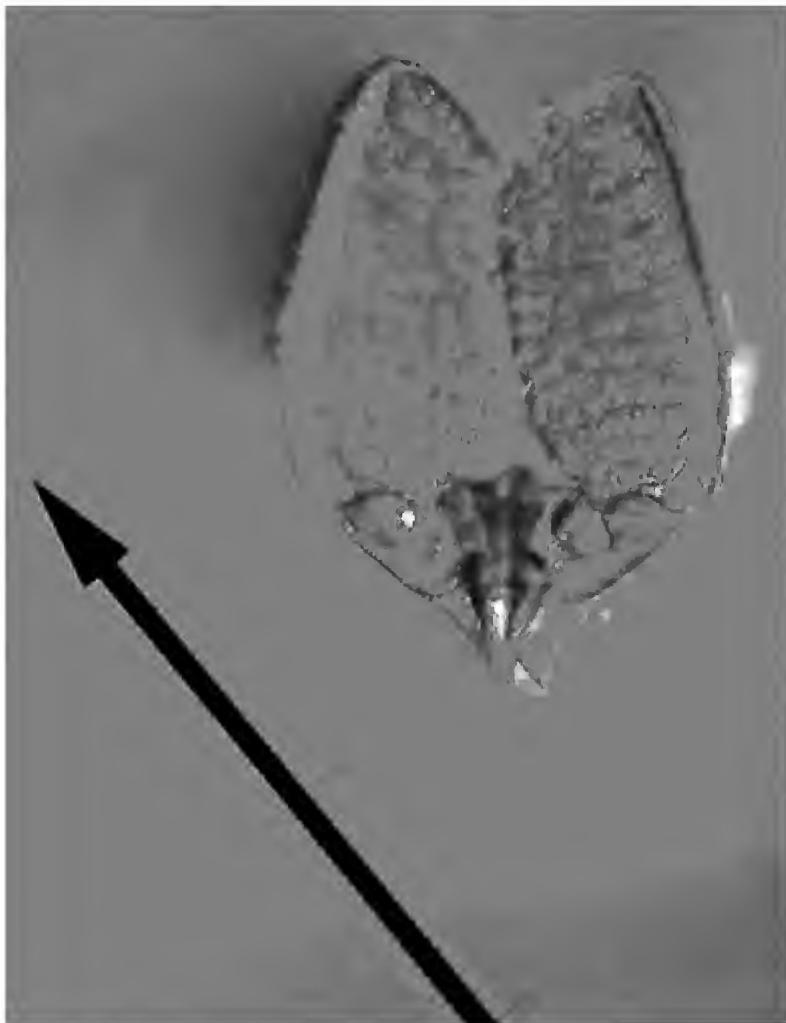
Translator/caudicle type:
ls/o

Pollinia apex type: R

Caudicle bulb: ?

Retinacula character: S

Hoya blashernaezii subsp. *nagcarlanensis* Kloppenburg & Mendoza
ISSN 2329-7336



Pollinaria enlarged ca.
140x.

Pollinium

length	0.36 mm
widest	0.20 mm

Retinaculum

length	0.10 mm
shoulder	0.14 mm
waist	0.05 mm
hip	0.10 mm
ext.	0.06 mm

Translator

length	0.13 mm
widest	0.04 mm

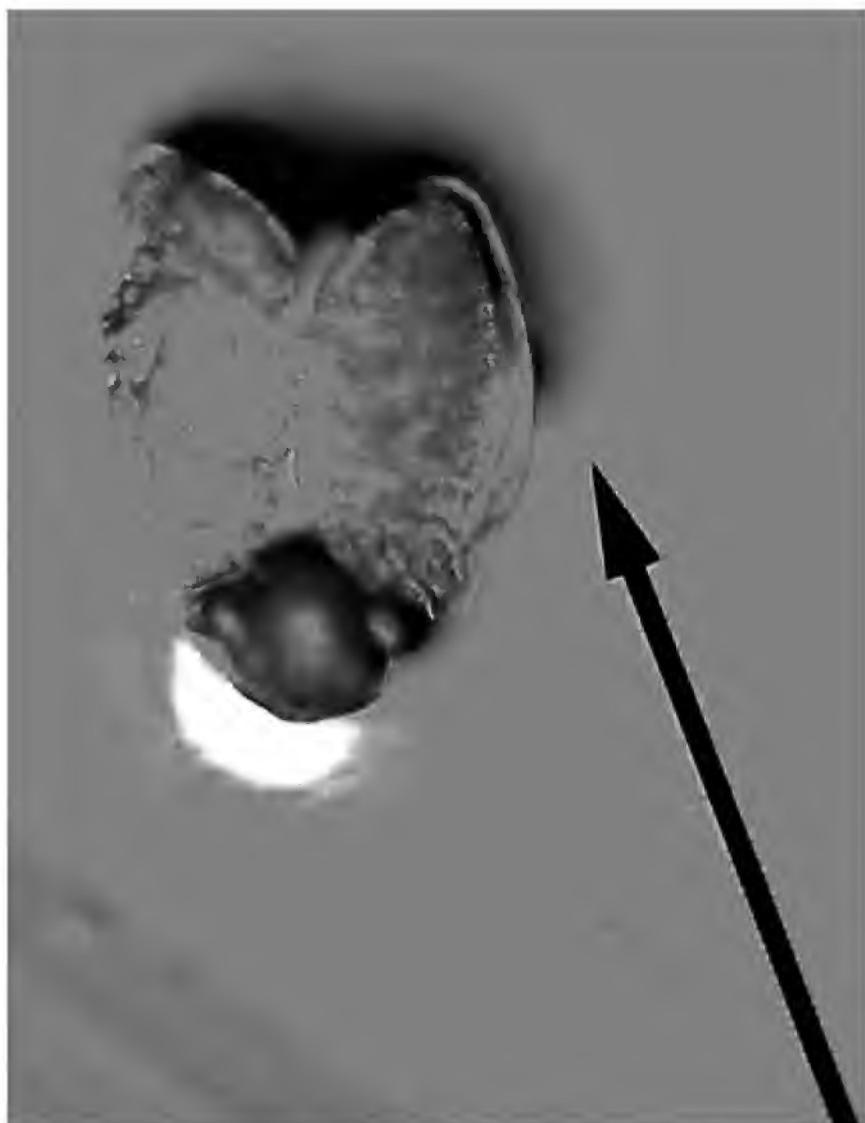
Caudicle **Type: G**
bulb diam. 0.07 mm

Translator/caudicle type:
ls/o

Pollinia end type: T

Retinacula: S

***Hoya blashernaiaeii* subsp. *parviora* Kloppenburg & Mendoza**
(unpublished) GM #116



Pollinaria
enlarged ca. 140x.

Pollinium
length 0.36 mm
widest 0.21 mm

Translator
length 0.05 mm

Retinaculum
length 0.15 mm
shoulder 0.15 mm
waist 0.11 mm
hip 0.14 mm

Caudicle
bulb diam. 0.06 mm

Translator/caudicle Type: ls/o ?
Pollinia apex type: T
Caudicle bulb: G
Retinacula character: LH

***Hoya spartioides* (Kuntz) Kloppenburg 2001**



Pollinarium enlarged about 165x. The pollinia here are broad and short with pellucid outer edges and a cellular vacuole inward. The retinacula and pollinia are very similar to *Hoya mindorensis* Schlechter. Here the caudicles are better formed, more structurally visible.

Pollinia

length	0.36 mm
widest	0.23 mm

Retinaculum

length	0.25 mm
width	0.25 mm

Translator

length	0.10 mm
depth	0.03 mm ca.
width	0.03 mm ca.

Caudicles

bulb diam.	0.09mm
	with distinct tail.

The retinaculum is nearly round with two raised sections on the upper outer edge, with the center rather open. Translators and caudicles attached about the middle, lower apex formed into a half crescent .

Translator/caudicle type: ls/o

Pollinia apex type: R

Caudicle bulb: G

Retinacula type: HU

***Hoya blashernaiaeii* subsp. *taywanisensis* Kloppenburg & Mendoza
(unpublished) GM #159**



Pollinaria enlarged
201x.

Pollinium

length	0.36 mm
widest	0.20 mm

Retinaculum

length	0.10 mm
shoulder	0.17 mm
waist	0.09 mm
hip	0.12 mm
ext.	0.05 mm

Translator

length	0.11 mm
widest	0.03 mm

Caudicle

bulb diam.	0.05 mm
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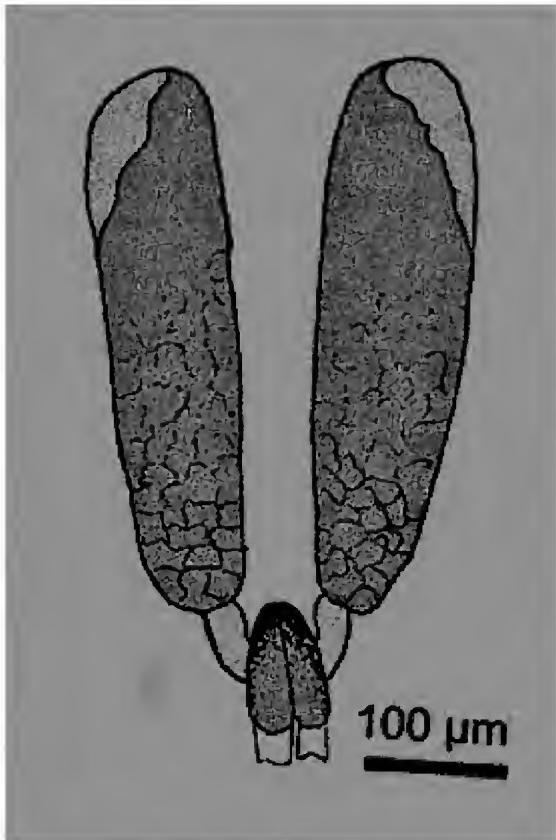
Translator/caudicle type:
ls/o

Pollinia apex type: R

Caudicle bulb: ?

Retinacula character: S

Hoya papaschonii Rodda 2014



Pollinaria (a drawing)

Pollinia

length: 0.36 mm
widest: 0.10 mm

Retinaculum

length: 0.08 mm
shoulder: ca. 0.06 mm
waist: ca.
ext.: 0.02 mm

Translators

length: 0.07 mm
depth: 0.02 mm

Caudicle

bulb diam.: not drawn

Translator/caudicle type: ls/o ?

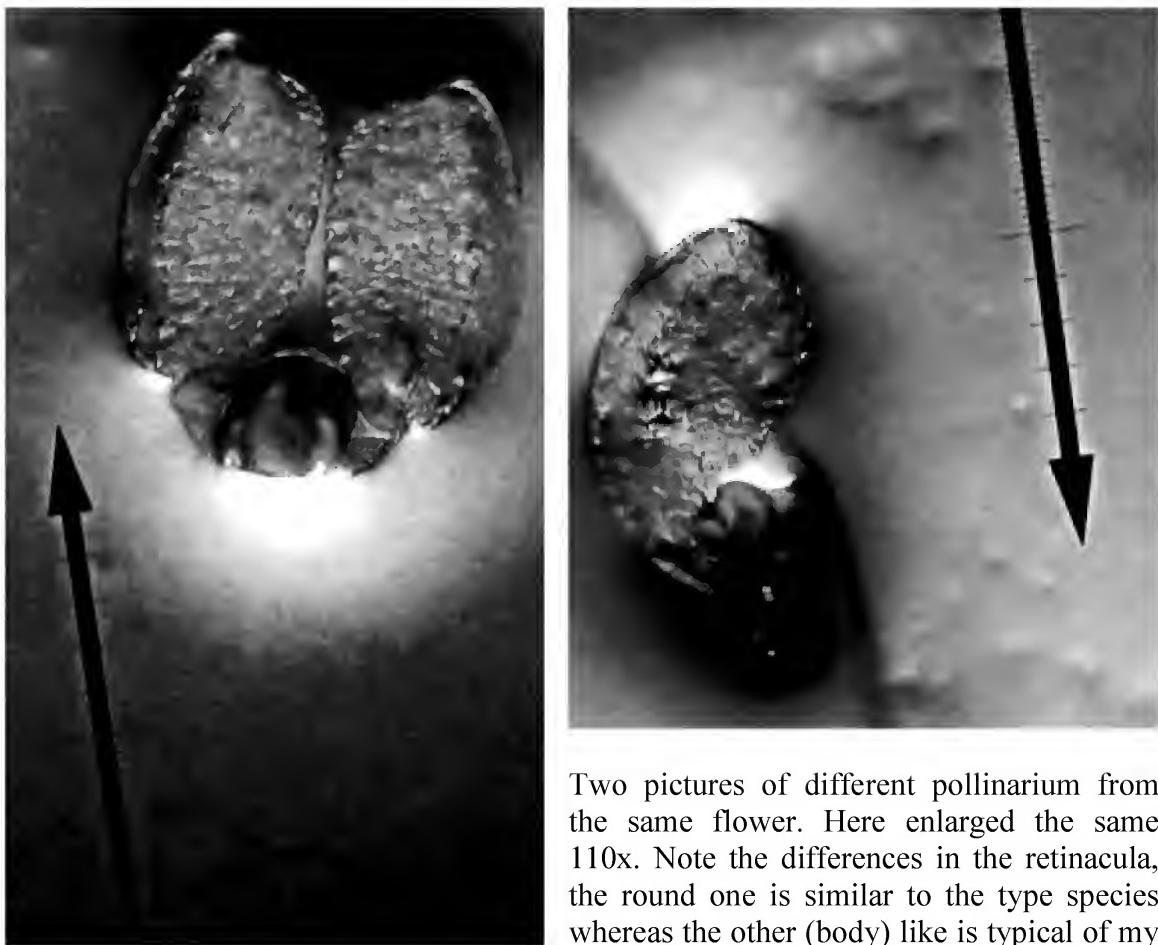
Pollinia apex type: R

Caudicle bulb: not separated from translators.

Retinacula character: E ?

A drawing lacking details maybe worth 100 words whereas a photo would have been worth 1,000 words. No pellucid edge shown, no caudicle translator differentiation.

***Hoya blashernaezii* subsp. *karencaseae* Kloppenburg & Mendoza**
 (unpublished) GM #164



Two pictures of different pollinarium from the same flower. Here enlarged the same 110x. Note the differences in the retinacula, the round one is similar to the type species whereas the other (body) like is typical of my species *H. siariae* later combined as a subspecies. The differences are why I placed the original species separately among some other differences. I have never seen this discrepancy in retinaculum before. Also the translators appear to be different.

Pollinium

length	0.35 mm
widest	0.23 mm

Translator/caudicle type: ls/o

Pollinia apex type: T

Retinaculum

length	0.12 mm
shoulder	0.15 mm
waist	0.09 mm
hip	0.10 mm
ext	0.10 mm
widest	0.02 mm

Translator

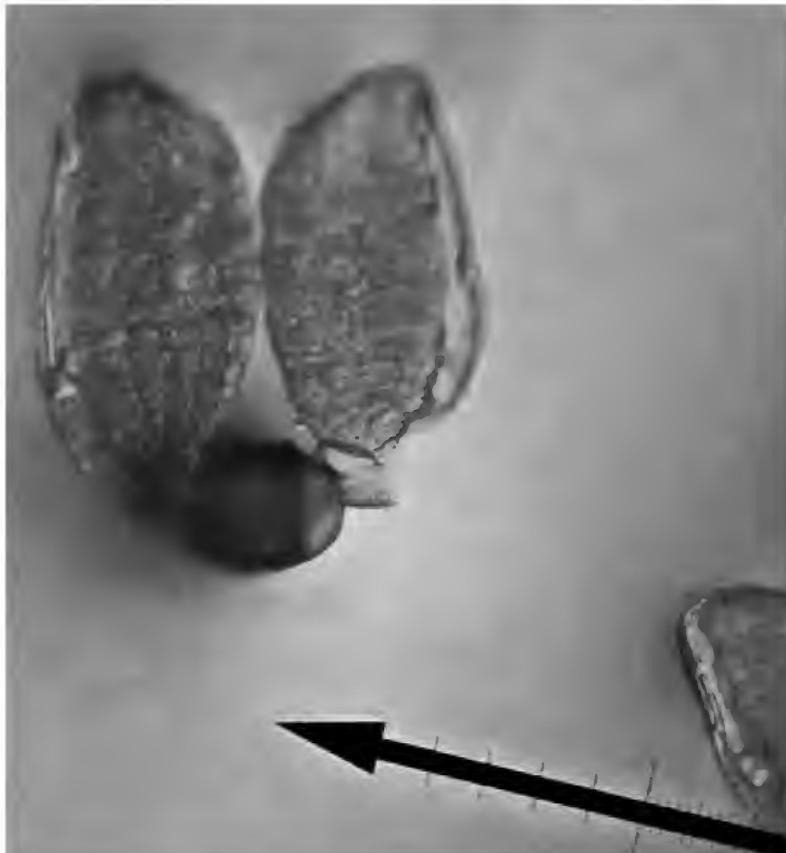
length 0.10 mm

Caudicle bulb: ?

Retinacula character: S

Caudicle bulb diam. 0.06 mm

***Hoya blashernaezii* subsp. *marizae* Kloppenburg & Mendoza**
(unpublished) GM #193



Pollinarium enlarged a little over 140x.

Pollinium

length	0.35 mm
widest	0.20 mm

Retinaculum

oval	0.15 x 0.10 mm
------	----------------

Translator

length	0.05 mm
widest	0.04 mm

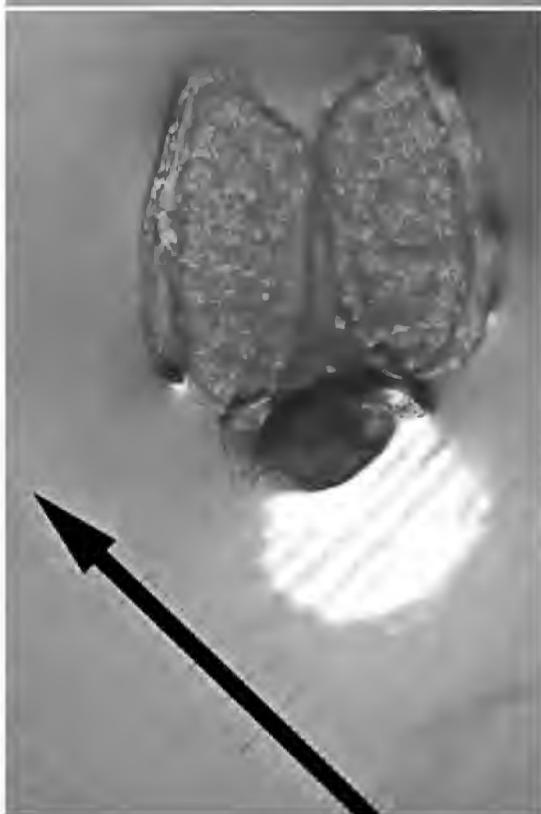
Caudicle

bulb is oval	0.06 x 0.04 mm
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Translator/caudicle type: difficult to classify but near ls/o or d/o

Pollinia apex type: T

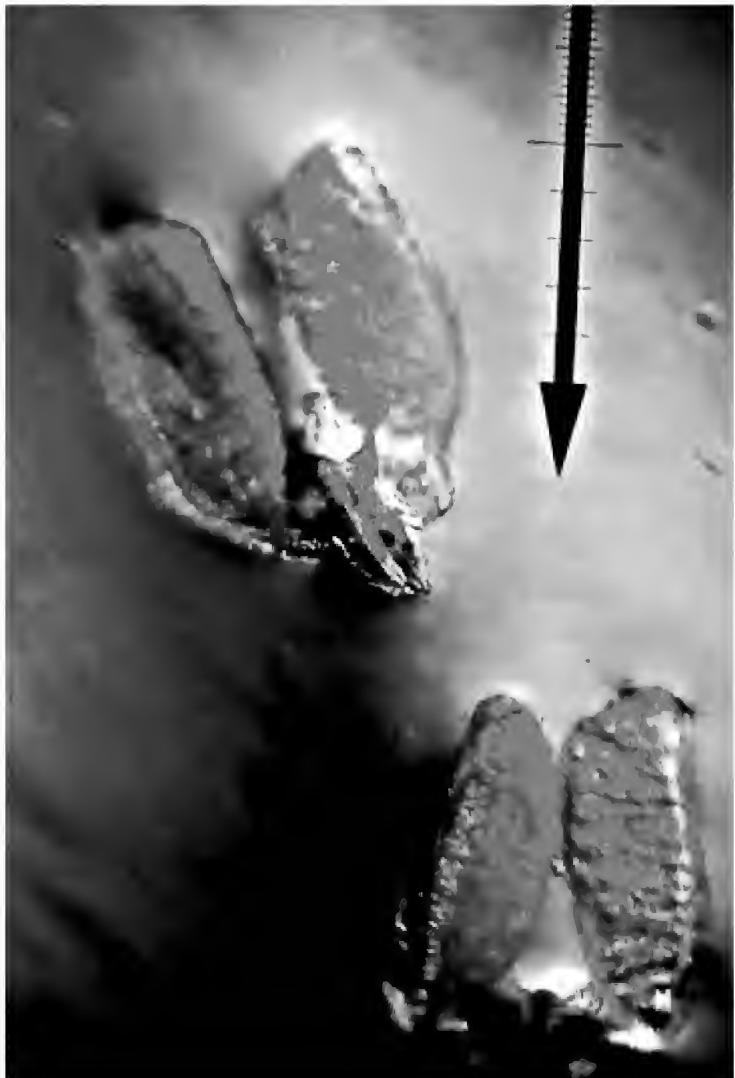
Caudicle bulb: C



Retinacula character:LH

Another photo of a different pollinium enlarged 120x. The retinacula are all alike oval in shape with translators and caudicles attached possibly inside but appear here lower left side to run down the outer edge and here the translator appears to be more delta shaped which would classify the structures as d/o. This retinacular type is the one found in *Hoya blashernaezii* but in only a few of the subspecies.

Hoya concava Kloppenburg, Siar, Cajano & Carandang 2014
CAHUP 5991
Photos 16 Nov. 2006



Pollinium enlarged a little less than 165x.

Pollinium

length	0.35 mm
widest	0.13 mm

Retinaculum

length	0.14 mm
shoulder	0.12 mm
waist	0.04 mm
hip	0.06 mm
ext.	0.04 mm

Translators

length	0.08 mm
depth	0.02 mm

Caudicle

bulb diam. 0.04 mm

Ratio: r/p 1.9

p/w 2.7

Translator/caudicle type:

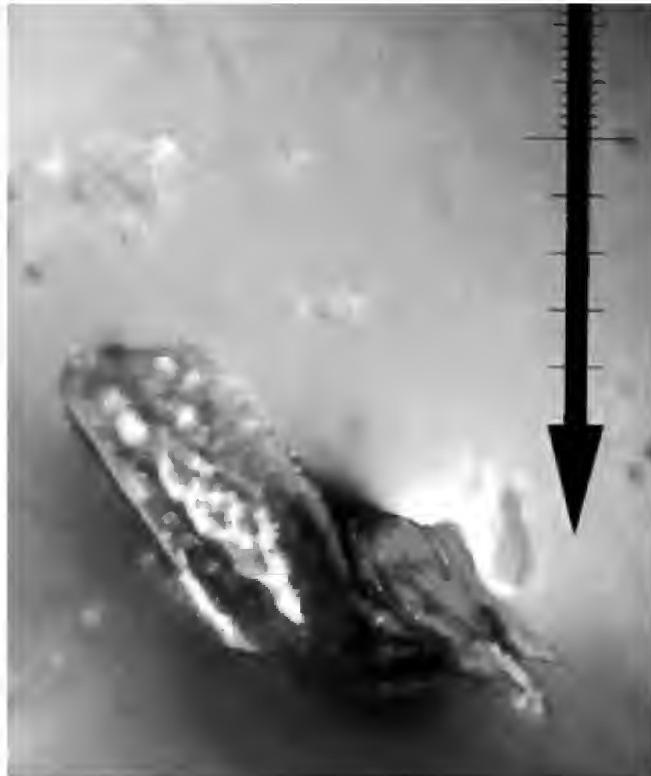
ls/o

Pollinia apex type: T

Caudicle bulb: ?

Retinacula character: HU

***Hoya carmelae* Kloppenburg, Siar & Ferreras 2010**



Pollinaria enlarged about 130x.

Pollinium

length	0.35 mm
widest	0.16 mm

Retinaculum

length	0.17 mm
shoulder	0.11 mm
waist	0.06 mm
hip	0.07 mm
ext.	0.06 mm

Translator

length	0.13 mm
depth	0.04 mm

Caudicle

bulb diam.	0.05 mm
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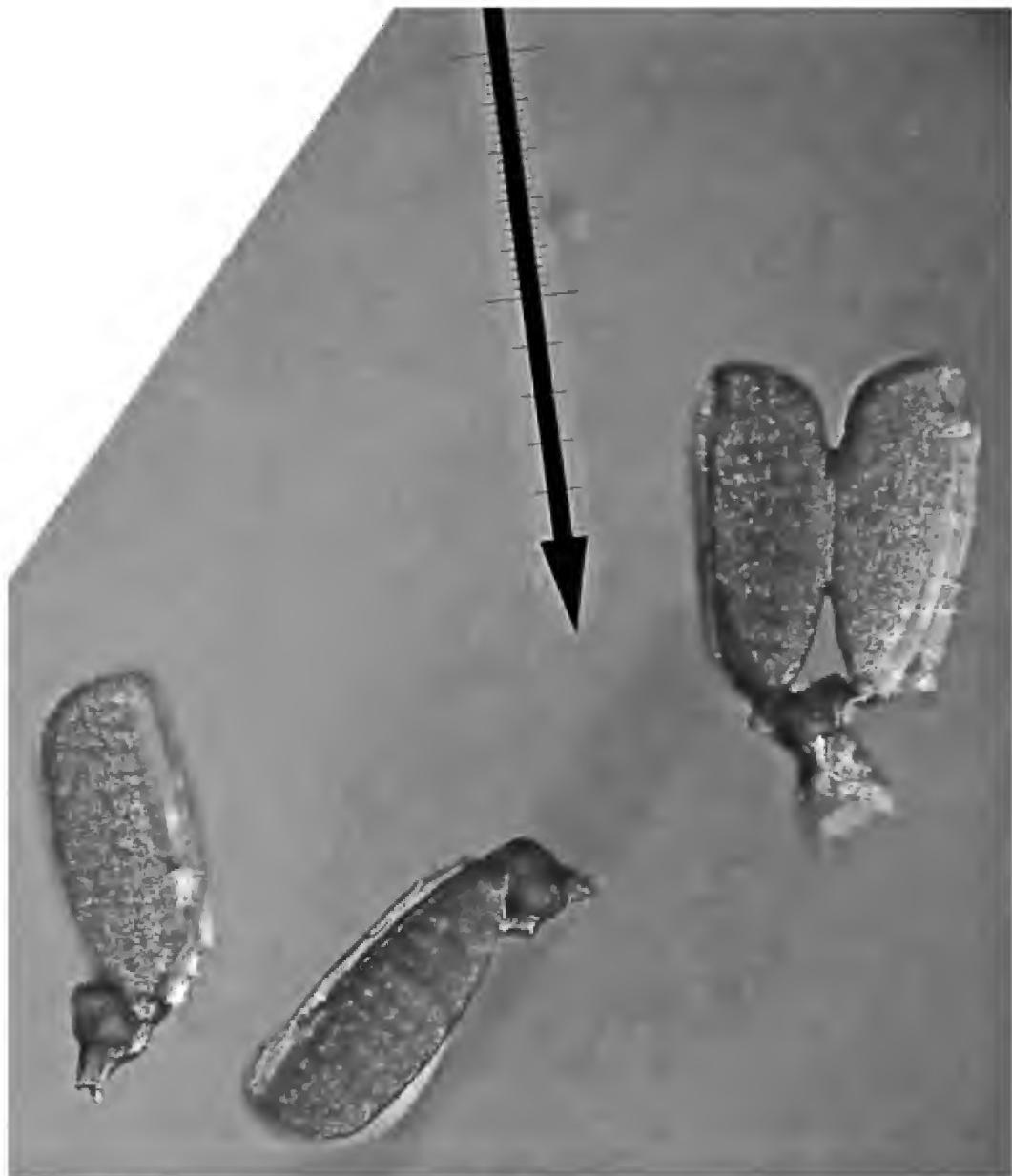
Translator/caudicle type: ls/o

Pollinia apex type: F

Caudicle bulb: ?

Retinacula character: HE

***Hoya eburna* subsp. *rosea* Kloppenburg & Mendoza
(unpublished) GM #39**



Pollinarium (picture above) enlarged ca. 130x.

Pollinium

length	0.35 mm
widest	0.15 mm

Retinaculum

length	0.08 mm
shoulder	0.10 mm

waist	0.06 mm
hip	0.08 mm
ext.	0.05 mm

Translator

length	0.08 mm
depth	0.03 mm

Caudicle

bulb diam. 0.04 mm

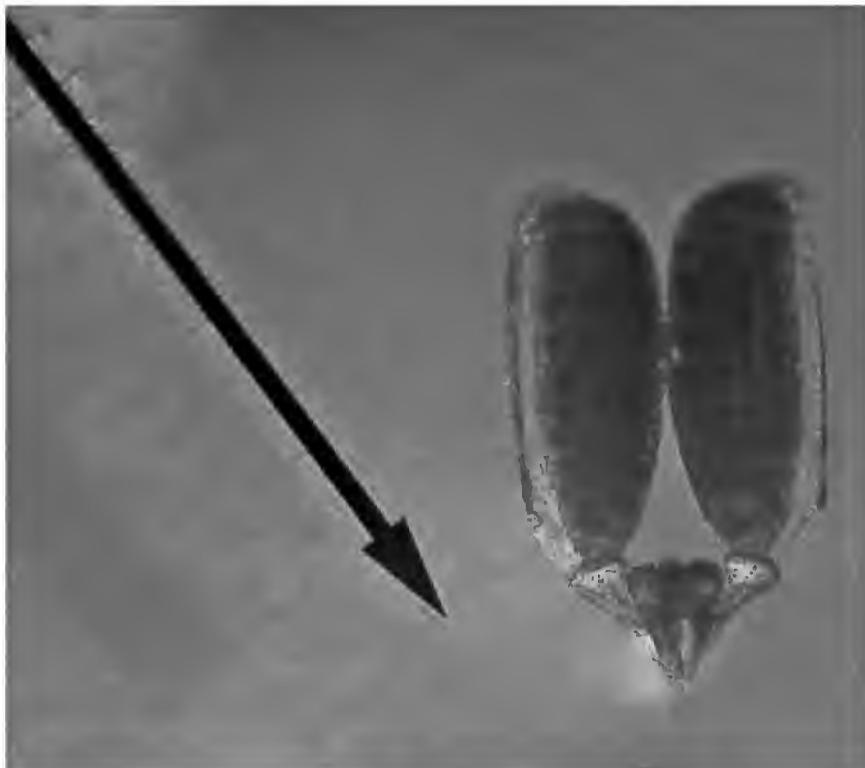
Translator/caudicle type: ls/o

Pollinia apex type: R

Caudicle bulb: G

Retinacula character: S

Hoya ginabrigidana Kloppenburg & Mendoza
(unpublished) GM #18



Pollinarium
enlarged ca. 190x.

Pollinium
length 0.35mm
widest 0.14mm

Retinaculum
length 0.06mm
shoulder 0.09mm
waist 0.06mm
hip 0.07mm
ext. 0.05mm

Translator
length 0.09mm
depth 0.02mm

Caudicle
bulb 0.05mm

Translator/caudicle Type: ls/o

Pollinia apex type: R

Caudicle bulb: G

Retinacula character: S

Hoya samarensis subsp. gutierrezii Kloppenburg 2014



A view of several pollinaria scale included is 1 mm in total length. It appears the pollinium in different photos are different length and widths. I do not know the reason ?

Pollinium

length	0.35 mm
widest	0.18 mm

Retinaculum

length	0.17 mm
shoulder	0.15 mm
waist	0.06 mm
hip	0.08 mm
ext	0.03 mm

Translator

length	0.08 mm
depth	0.02 mm

Caudicle

bulb diam.	0.05 mm
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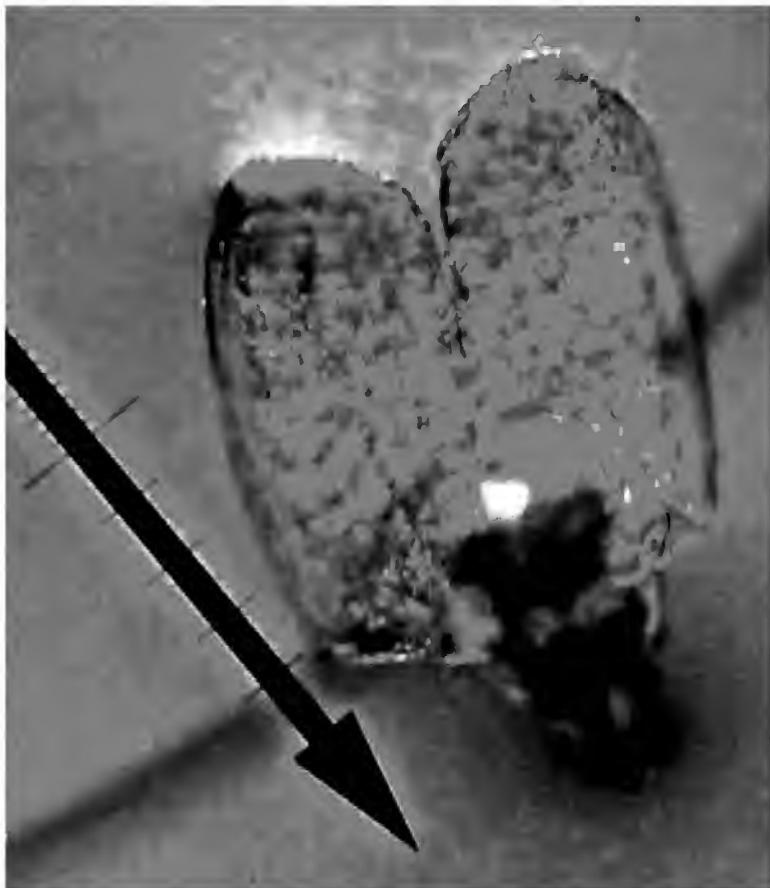
Translator/caudicle type: ls/o

Pollinia inner end type: F

Retinacula: S

Hoya foliapalmata Kloppenburg & Mendoza
(unpublished)

Pollinaria enlarged 190x.



Pollinium

length	0.35 mm
widest	0.17 mm

Retinaculum

length	0.13 mm
shoulder	0.11 mm
waist	0.06 mm
hip	0.10 mm
ext	0.05 mm

Translator

length	0.06 mm
wide	0.02 mm

Caudicle

bulb diam.	0.05 mm
------------	---------

Translator/caudicle type:
ls/o

Pollinia apex type: R

Caudicles: G

Retinacula type: S or maybe HU

Hoya crassicaulis Elmer ex Kloppenburg 1995



Pollinarium from the above sheet. The reticule lines below the picture are 1/100 of a mm. between two longest lines is 1/10 of a mm.

Pollinia

length	0.34
widest	0.13

Retinacula

length	0.15
shoulder	0.08

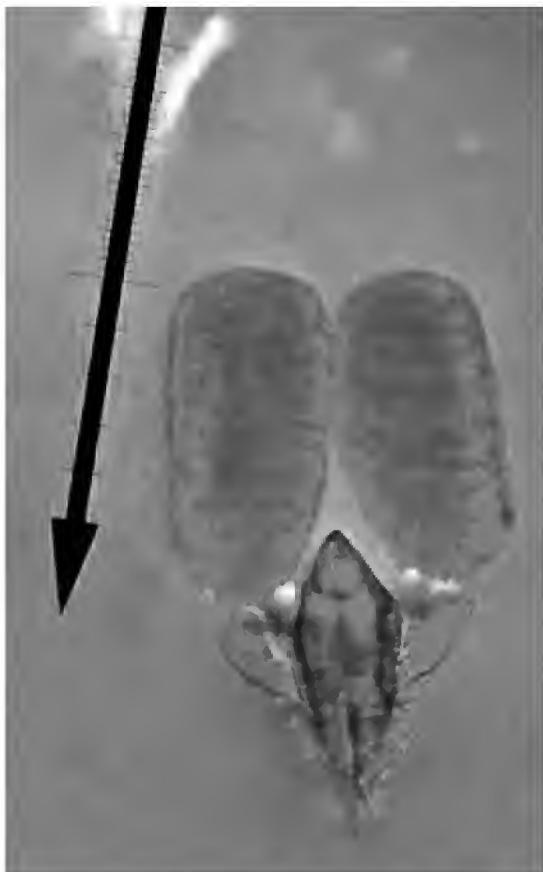
Translator/caudicle type: ls/o

Pollinium inner end type: T

Caudicle: C

Retinaculum: E

***Hoya heuschkeliana* subsp. *mendozai* Kloppenburg**
(unpublished) GM #47



Pollinarium enlarged ca. 120x.

Pollinium

length	0.34 mm
widest	0.18 mm

Retinaculum

length	0.17 cm
widest	0.11 mm
ext.	0.15 mm

Translator

length	0.15 mm
widest	0.05 mm

Caudicle

bulb diam.	0.05 mm
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Translator/caudicle type: ls/o

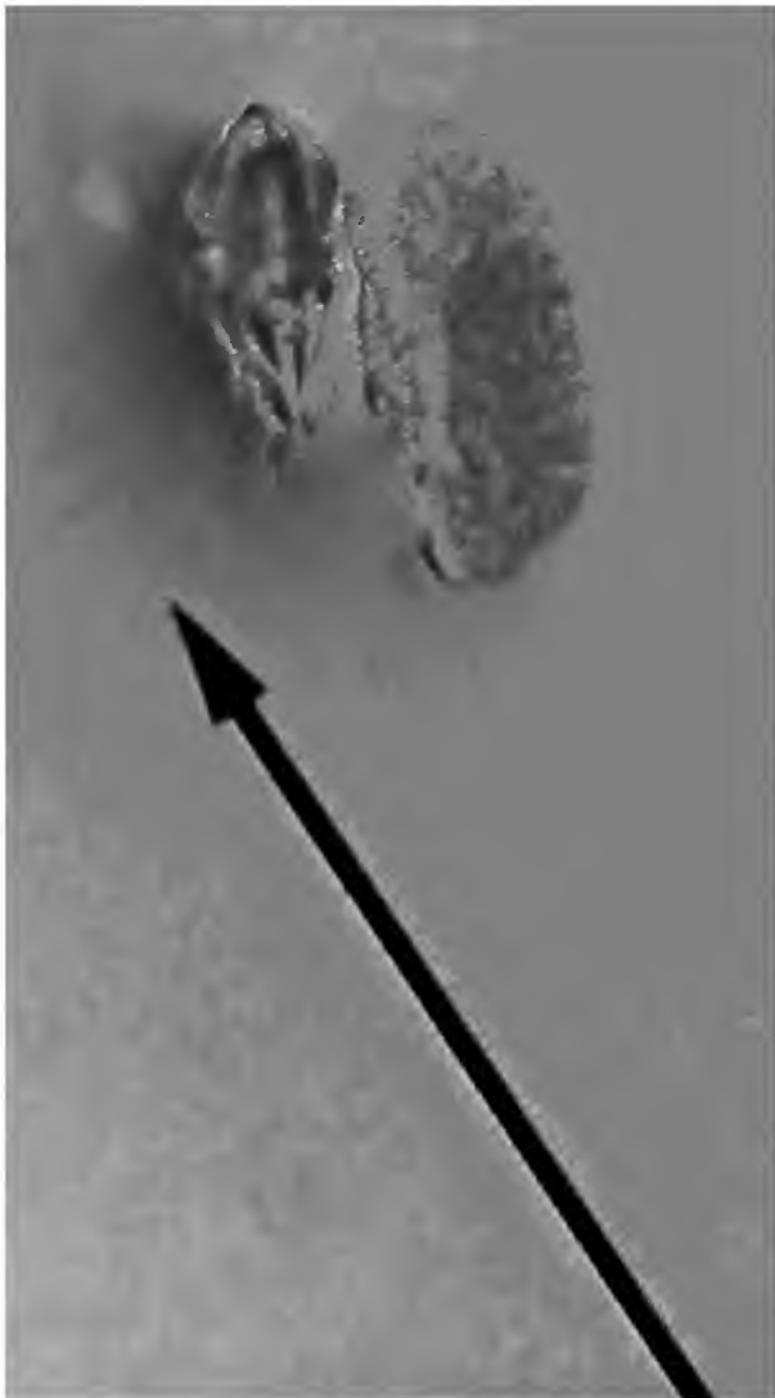
Pollinia apex type: R

Caudicle bulb: C

Retinacula character: HE

Hoya navicula Kloppenburg & Mendoza 2015

GM #71 Collected by George Mendoza et al at Catanduanes, Bicol, Philippines



Pollinia apex type: RT

Translator/caudicle type: ls/o ?

Caudicle bulb: ?

Retinacula character: S

Pollinaria enlarged ca. 180x, I had a difficult time trying to find pollinaria where the pollinium were attached to the caudicles. Only one among 15. Here a pollinium turned down at side of the retinaculum. Difficult to determine the translator/caudicle type but I would judge it is ls/o

Pollinium

length	0.34 mm
widest	0.15 mm

Retinaculum

length	0.17 mm
shoulder	0.11 mm
waist	0.08 mm
hip	0.09 mm
ext	0.08 mm

Caudicle

bulb diam.	0.05 mm
------------	---------



Photo of two pollinia above enlarged ca. 50x

Hoya auroraensis Kloppenburg & Mendoza
(unpublished) GM #114



Pollinaria enlarged left ca. 124x; Right ca. 120x.

Pollinium

length	0.33 mm
widest	0.15 mm

Retinaculum

length	0.10 mm
shoulder	0.09 mm
waist	0.07 mm
hip	0.08 mm
ext.	0.03 mm

Translator

length	0.10 mm
wide	0.03 mm

Caudicle

bulb dial	0.06 mm
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Translator/caudicle type: ls/o possibly p/o

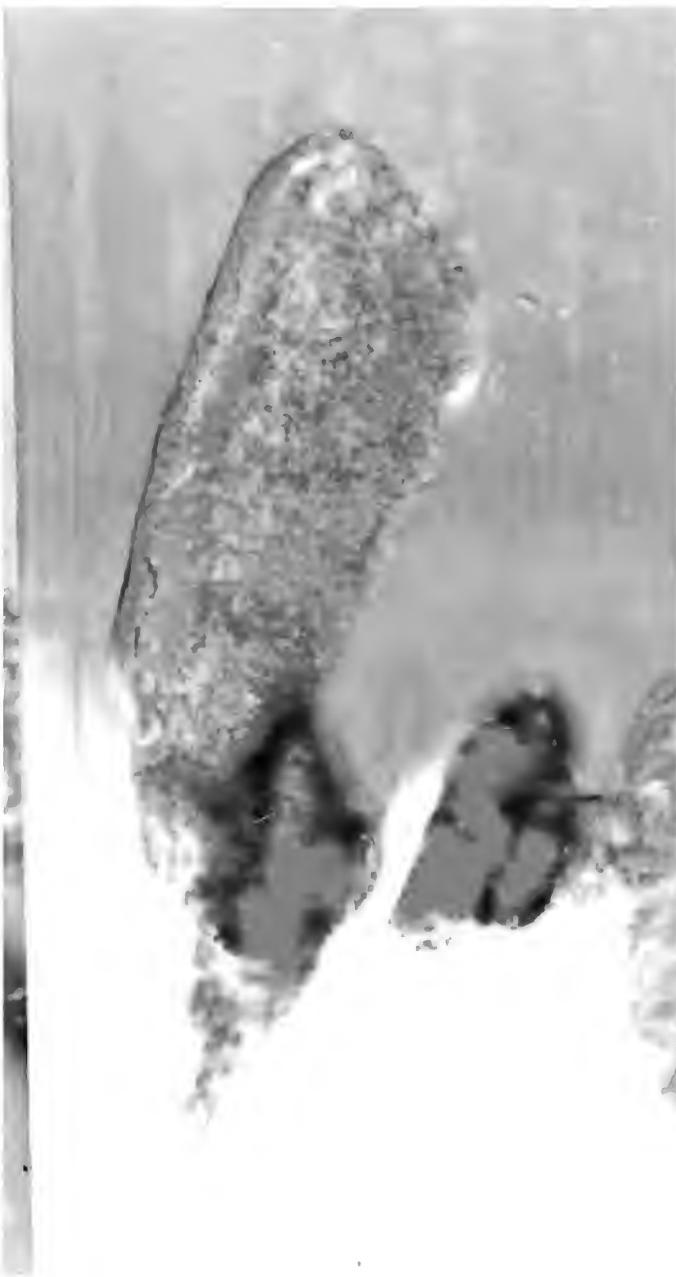
Pollinia apex type: RT

Caudicle bulb: ?

Hoya samarensis Kloppenburg & Siar 2012

Type clone

Collectors: PNH 7304 R. S. & G, Visayas 29 Oct. 1993. Western Samar. Mt. Malimngon.
Brg. Lokilokon, Peramas



Pollinaria enlarged about
165x.

Pollinium

length	0.33 mm
Widest	0.14 mm

Retinaculum

length	0.19 mm
shoulder	0.11 mm
Waist	0.07 mm
hip	0.09 mm
ext	0.04 mm

Translator

length	0.08 mm
depth	0.02 mm

Caudicle

bulb diam.	0.04 mm
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Ratio: r/p 1.4

p/w 2.3

Translator/caudicle type: ls/o

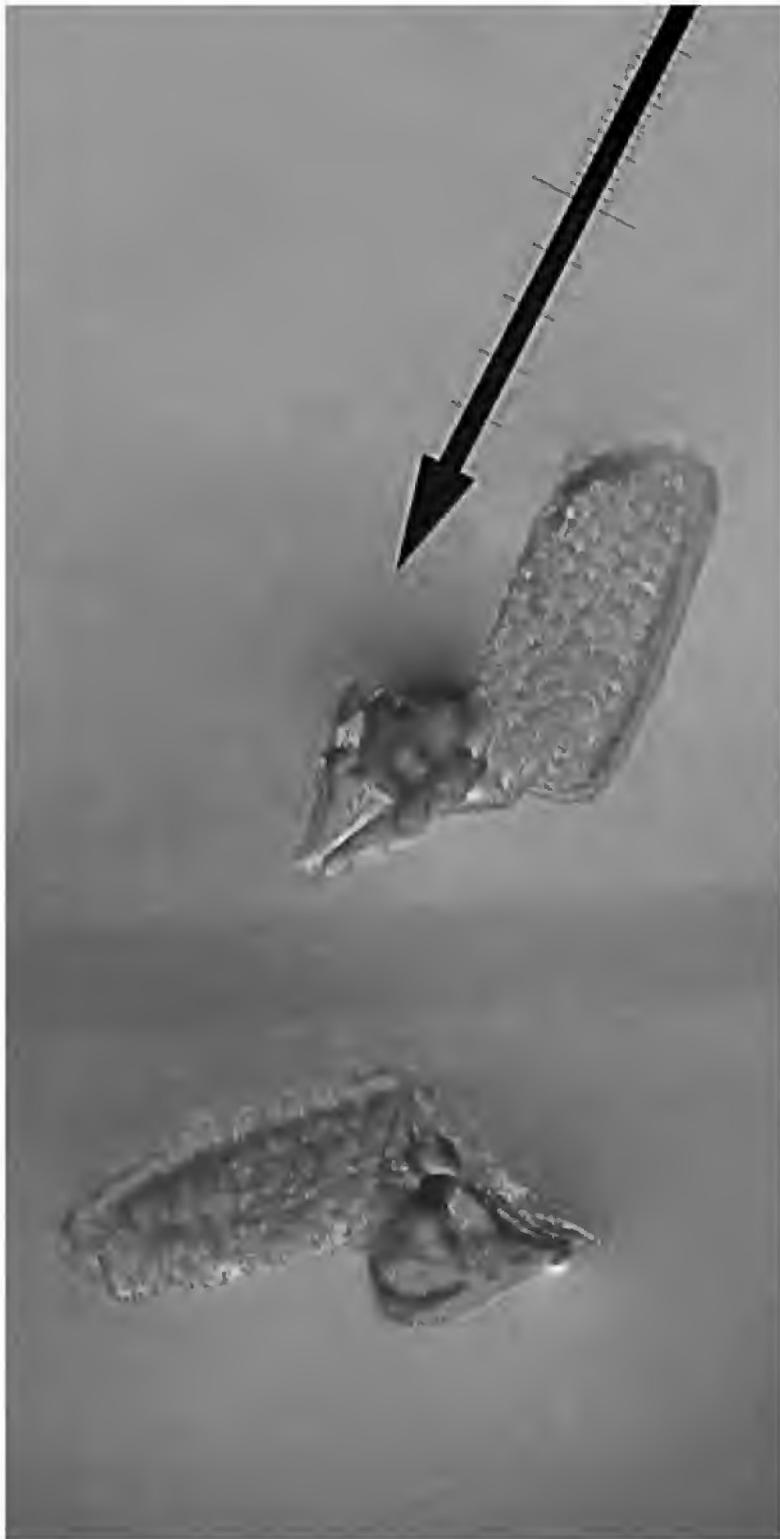
Pollinia apex type: T

Caudicle bulb: ?

Retinacula character: S

I had previously thought
this sp. might be *H. pentaphlebia*
but the leaf is wrong and the
pollinium too short among
differences.

***Hoya coronarubra* Kloppenburg & Mendoza**
(unpublished) GM #117



Pollinaria enlarged ca,
150x.

Pollinaria

length	0.33 mm
widest	0.16 mm

Retinaculum

length	0.10 mm
shoulder	0.12 mm
waist	0.09 mm
hip	0.11 mm
ext.	0.09 mm

Translator

length	0.10 mm
wide	0.02 mm

Caudicle

bulb diam.	0.05 mm
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Translator/caudicle

Type: ls/o

Pollinia apex type: T

Caudicle bulb: G

Retinacula character: S

Hoya diptera Seemann 1861

Pollinarium from flower via Ann Wayman.



Magnified approximately 165x.

Pollinium

length:	0.32 mm
widest:	0.16 mm

Retinaculum

length:	0.13 mm
shoulder:	0.06 mm
widest	0.05 mm
hip:	0.07 mm
ext.:	0.04 mm

Translators

length:	0.14 mm
depth:	0.05 mm

Caudicle

bulb diam.: 0.09 mm

Translator/caudicle Type: ls/o

Pollinia inner apex type: R

Caudicle bulb: C

Retinacula character: S

Hoya latifolia G. Don 1838

Flower from Ann Wayman Central Point, OR. Species not correct,
labeled *Hoya microphylla* alba.



The pollinarium at different focal lengths, enlarged about 165x in an attempt to show the 'lobed' structure of the retinaculum. G. Don mentions a 3-lobed pollen-carrier. Here the shoulders of the retinaculum are broad, and even flared outward, the waist is narrow and there is again flaring at the hip area (most visible on the right hand photo).

Pollinia

length	0.32 mm
widest	0.15 mm

Retinaculum

length	0.16 mm
shoulder	0.10 mm
waist	0.05 mm
hip	0.08 mm
extensions	0.05 mm

Translators

length	0.09 mm
depth	0.04 mm
wide	0.02 mm

Caudicle

bulb diam.	0.06 mm
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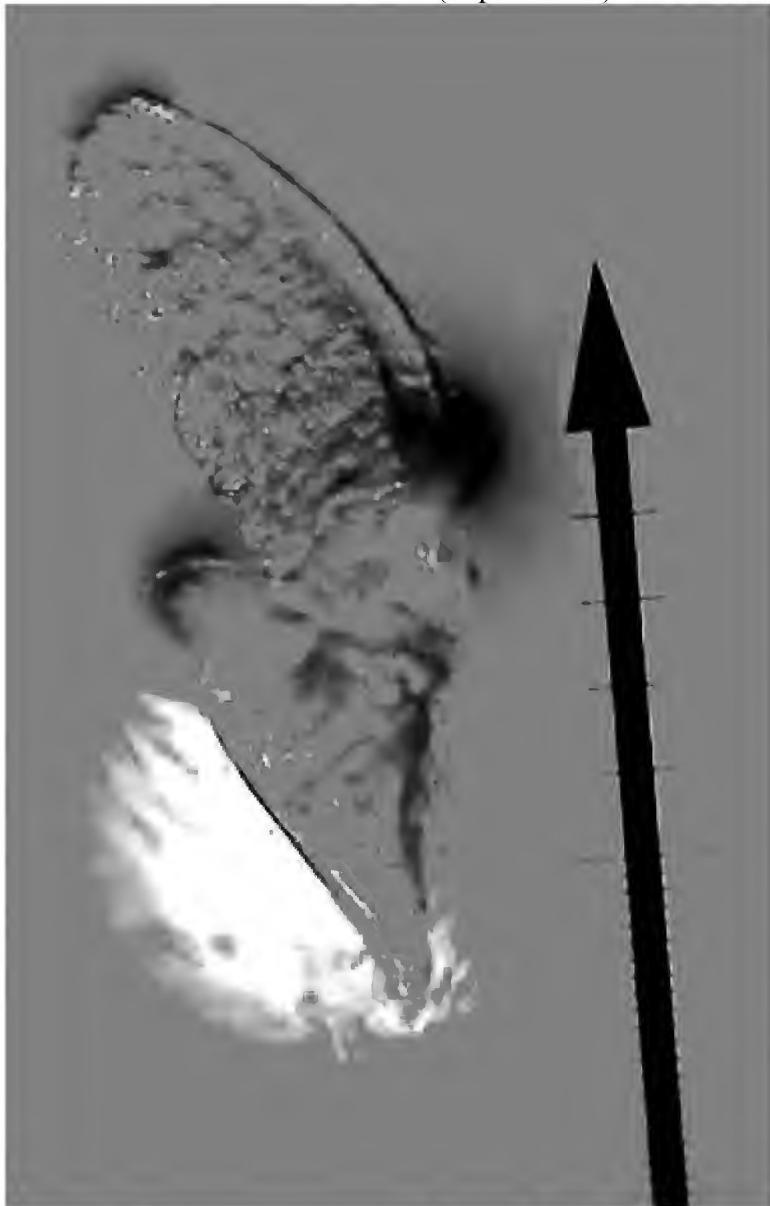
Translator/caudicle Type: ls/o

Caudicle bulb: G

Pollinia inner apex type: RF

Retinacula character: S

Hoya marquisii Kloppenburg & Mendoza
(unpublished) GM #63



Pollinaria enlarged ca. 220x, I could not get the retinaculum to lay flat even on 5 specimens, see the retinacula in the dorsal view of the corona below it has a long narrow head, narrow body with waist and then a hip area just above the spreading extensions.

Pollinium

length	0.32 mm
widest	0.15 mm

Retinaculum

length	0.22 mm
hip	0.14 mm

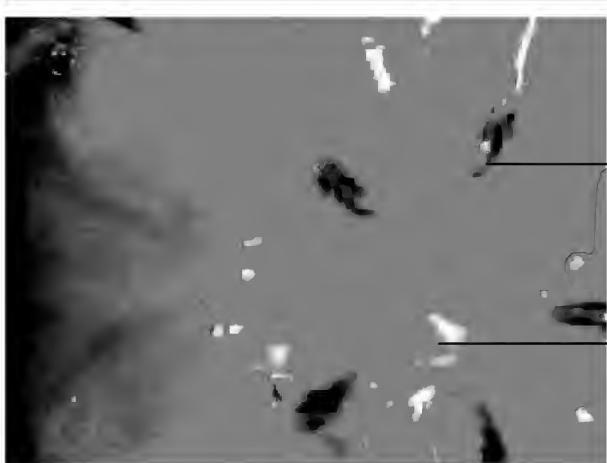
long inner area rounded
(see below)

Translator/caudicle type:
Is/o difficult to tell but
most likely correct.

Pollinia inner end type: T

Caudicle bulb: C

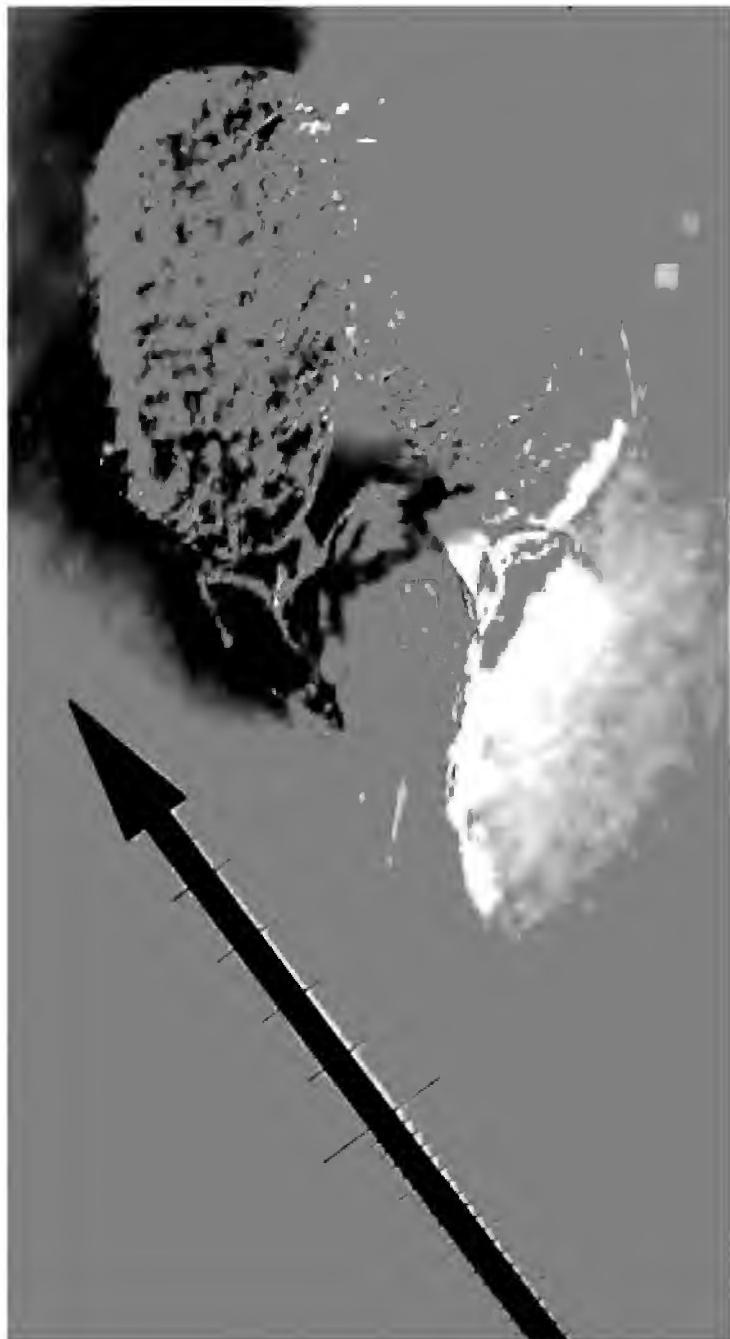
Reticula: S



Retinaculum
Head end inward and line at the hip area

where the translators are attached.
Inner corona lobe apex
narrow with a keeled dorsal.

***Hoya heuschkeliana* subsp. *marionii* Kloppenburg & Ferreras 2014**
PUH #14647



Pollinarium enlarged ca. 200x

Pollinium

length	0.31 mm
widest	0.17 mm

Retinaculum

length	0.18 mm
shoulder	0.13 mm
waist	0.09 mm
hip	0.10 mm
ext.	0.09 mm

Translator

length	0.12 mm
depth	0.05 mm

Caudicle

bulb diam. 0.06 mm

Translator/caudicle type ls/o

Pollinia inner end type: R

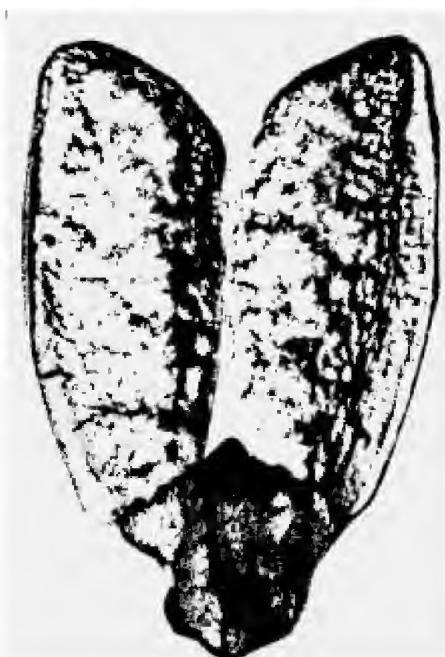
Caudicle bulb: C

Retinacula character: R

Hoya sp. IML 850 affinis H. macgregorii

Collected by DMC, #1713

Grown and flowered in Fresno, CA.



Magnified approximately 165x.

Pollinium

length:	0.31 mm
widest:	0.17 mm

Retinaculum

length:	0.18 mm
shoulder:	0.11 mm
waist:	0.08 mm
hip:	0.11 mm
ext.:	?

Translators

length:	0.09 mm
depth:	0.03 mm

Caudicle

bulb. diam.: ?

Translator/caudicle type ls/o

Pollinia inner end type: T

Caudicle bulb: ?

Retinacula character: S

Hoya camphorifolia Warburg 1904

Not the species:



Pollinarium enlarged about 165x.

Pollinia

length	0.31 mm
widest	0.15 mm

Retinaculum

length	0.08 mm
shoulder	0.08 mm
waist	0.03 mm
hip	0.04 mm
extensions	0.02 mm

Translator

length	0.05 mm
depth	0.01 mm

Caudicle

bulb. diam.	0.03 mm.
-------------	----------

Translator/caudicle type ls/o

Pollinia inner end type: T

Caudicle bulb: ?

Retinacula character: HU ?

***Hoya williamsiana* subsp. *calendulina* Kloppenburg & Mendoza**
(unpublished) GM #83



Pollinarium enlarged ca. 120x

Pollinium

length	0.30 mm
widest	0.11 mm

Retinaculum

length	0.10 mm
shoulder	0.07 mm
hip	0.04 mm
waist	0.05 mm
ext.	0.02 mm

Translator

length	0.09 mm
wide	0.02 mm

Translator/caudicle type: ls/o

Pollinia end type: R

Caudicle

bulb diam.	0.04 mm
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Caudicle bulb: G

Retinacula character: S

Hoya cyclaminea Kloppenburg & Mendoza
(unpublished) GM #9



Pollinaria
enlarged ca. 190x.

Pollinium
length 0.28 mm
widest 0.12 mm

Retinaculum
length 0.06 mm
ext. 0.04 mm

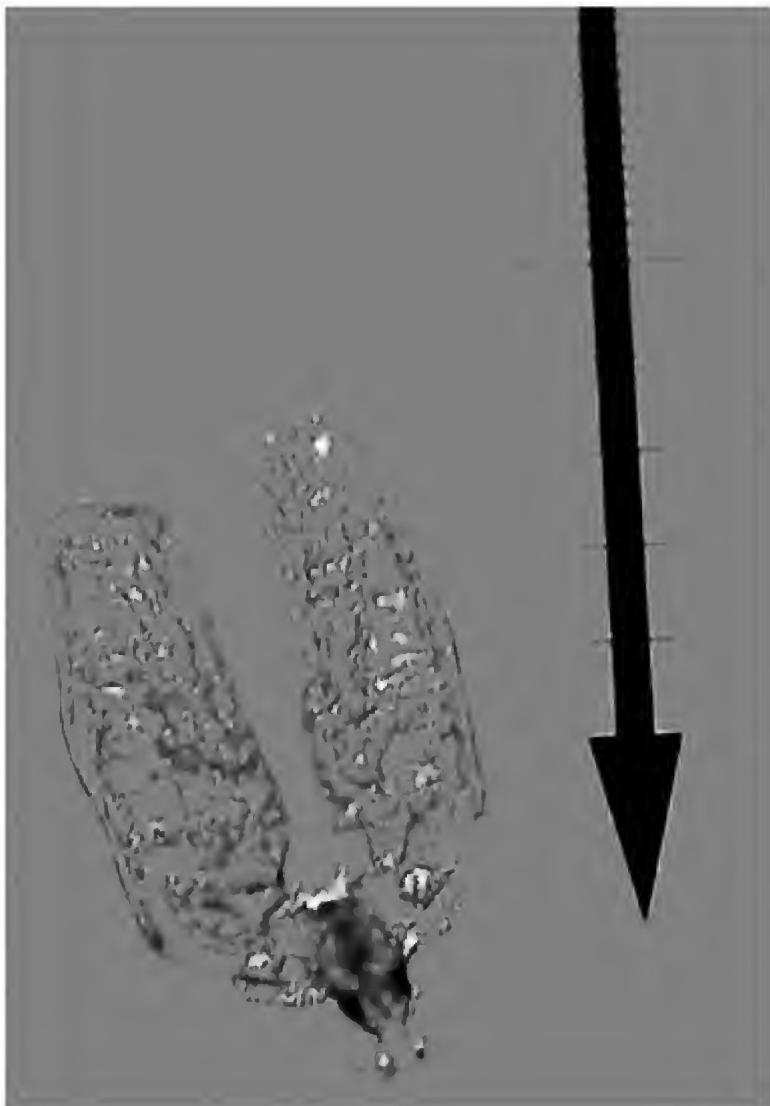
Translator
length 0.03 mm

Caudicle
bulb 0.02 mm

Translator/caudicle type: ls/o **Pollinia end type:** R **Caudicle bulb:** G

Ratios: p/w 2.3 p/r 4.7 **Retinacula character:** S

***Hoya viscayaensis* Kloppenburg & Mendoza**
(unpublished) GM #95



Pollinaria enlarged ca.
240x.

Pollinium

length	0.27 mm
widest	0.10 mm

Retinaculum

length	0.08 mm
shoulder	0.08 mm
waist	0.05 mm
hip	0.06 mm
ext	0.03 mm

Translator

length	0.05 mm
wide	0.02 mm

Caudicle

bulb diam.	0.04 mm
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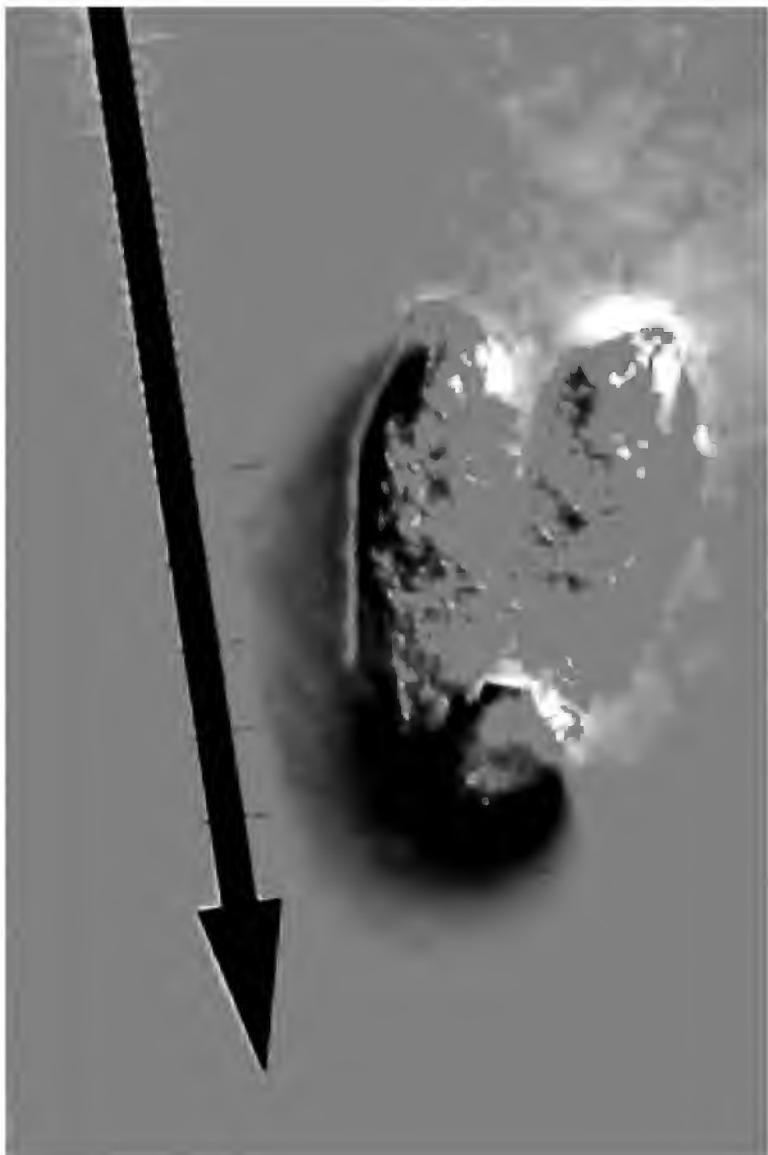
Translator/caudicle type:
ls/o

Pollinia end type: RF

Caudicle bulb: G

Retinacula character: HU

***Hoya bakerensis* Kloppenburg & Mendoza**
(unpublished) GM #113



Pollinaria enlarged 210x.

Pollinium

length	0.26 mm
widest	0.10 mm

Retinaculum

length	0.10 mm
widest	0.08 mm

Translator

length	0.04 mm
wide	0.01 mm

Caudicle

bulb diam.	0.03 mm
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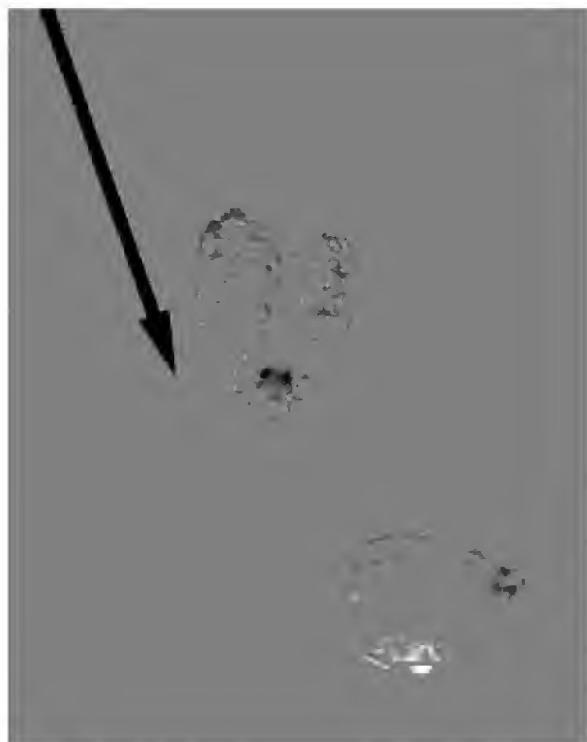
Translator/caudicle type:
ls/o

Difficult to delineate the retinaculum from this micro-photo may be turned on its axis, appears to be nearly round.

Pollinia inner apex type: F

Caudicle bulb: ?

***Hoya marananiae* Kloppenburg, Siar, Guevarra & Carandang 2015**
Type clone



Two Pollinaria enlarged about 150x.

Pollinarium

length	0.25 mm
widest	0.13 mm

Retinaculum

length	0.05 mm
shoulder	0.06 mm
waist	0.04 mm
hip	0.05 mm
ext.	0.06 mm

Translator

length	0.06 mm
depth	0.01 mm

Caudicle

bulb. diam.	0.03 mm
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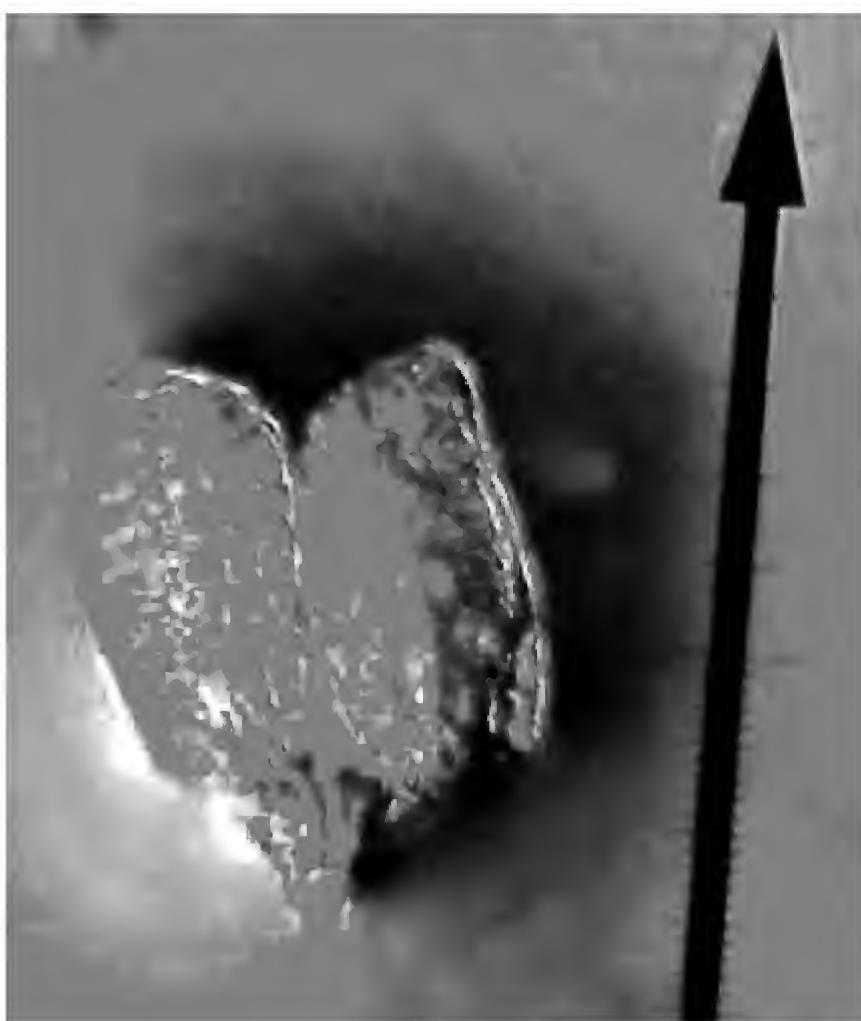
Translator /caudicle type: ls/o

Pollinia end type: R

Caudicle bulb: ?

Retinacula character: S nearly HU

***Hoya nakarensis* subsp. *cadmia* Kloppenburg & Mendoza**
(unpublished) GM #111



Pollinarium
enlarged ca. 220x.

Pollinium

length 0.25 mm
widest 0.12 mm

Retinaculum

length 0.06 mm
shoulder 0.10 mm
waist 0.03 mm
hip 0.05 mm
ext. 0.03 mm

Translator

length 0.05 mm
wide 0.02 mm

Caudicle

bulb diam. 0.04 mm

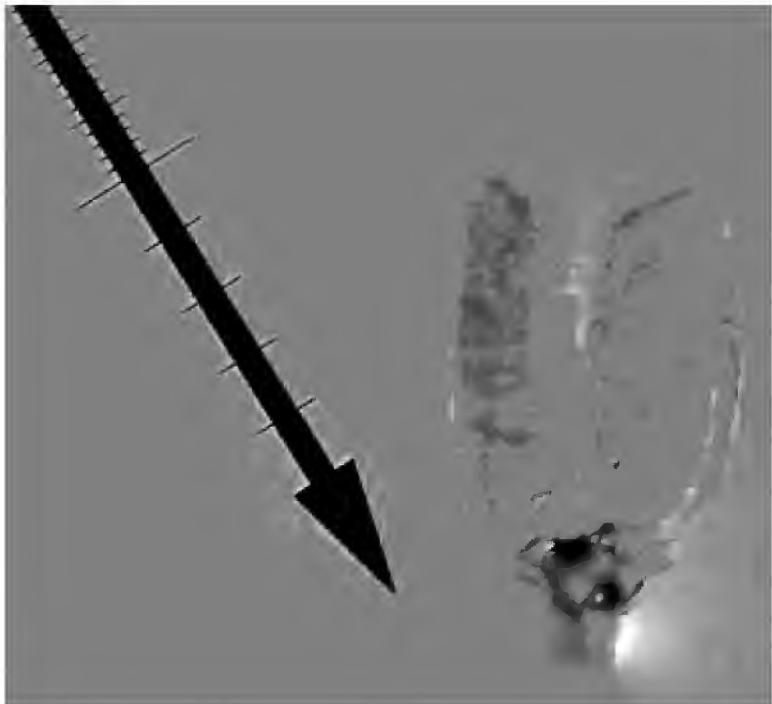
Translator/caudicle type: ls/o

Pollinia apex type: R

Caudicle bulb: ?

Retinacula character: S

Hoya lagyoensis Kloppenburg & Mendoza
(unpublished) GM #185



Pollinaria enlarges 180x.

Pollinium

length	0.25 mm
widest	0.10 mm

Retinaculum

length	0.06 mm
shoulder	0.08 mm
waist	0.05 mm
hip	0.06mm
extensions	0.04 mm

Translator

length	0.04 mm
widest	0.01 mm

Caudicle

bulb diam.	0.03 mm
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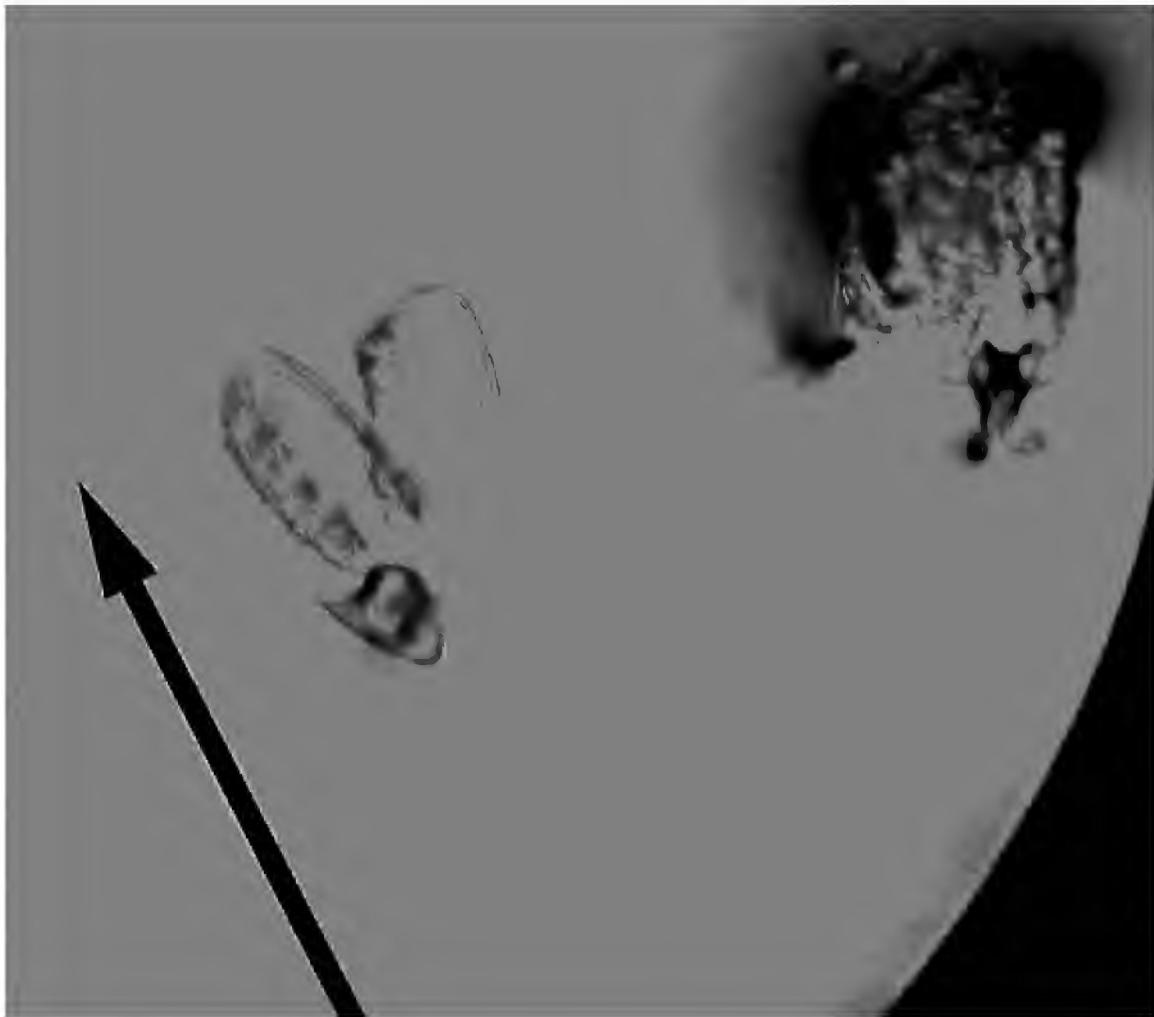
Translator/caudicle type: ls/o

Pollinia apex type: RT

Caudicle bulb: C

Retinacula character: S

***Hoya martinii* subsp. *daraitionensis* Kloppenburg & Mendoza**
(unpublished) GM #184



Pollinium enlarged 150x.

Pollinium

length	0.24 mm
widest	0.12 mm

Retinaculum

length	0.07 mm
shoulders	0.08 mm
waist	0.04 mm
ext.	0.05 mm
hip	0.05 mm

Translator

length	0.03 mm
widest	less than 0.01 mm

Caudicle

diam 0.03 mm

Translator/caudicle type: ls/o

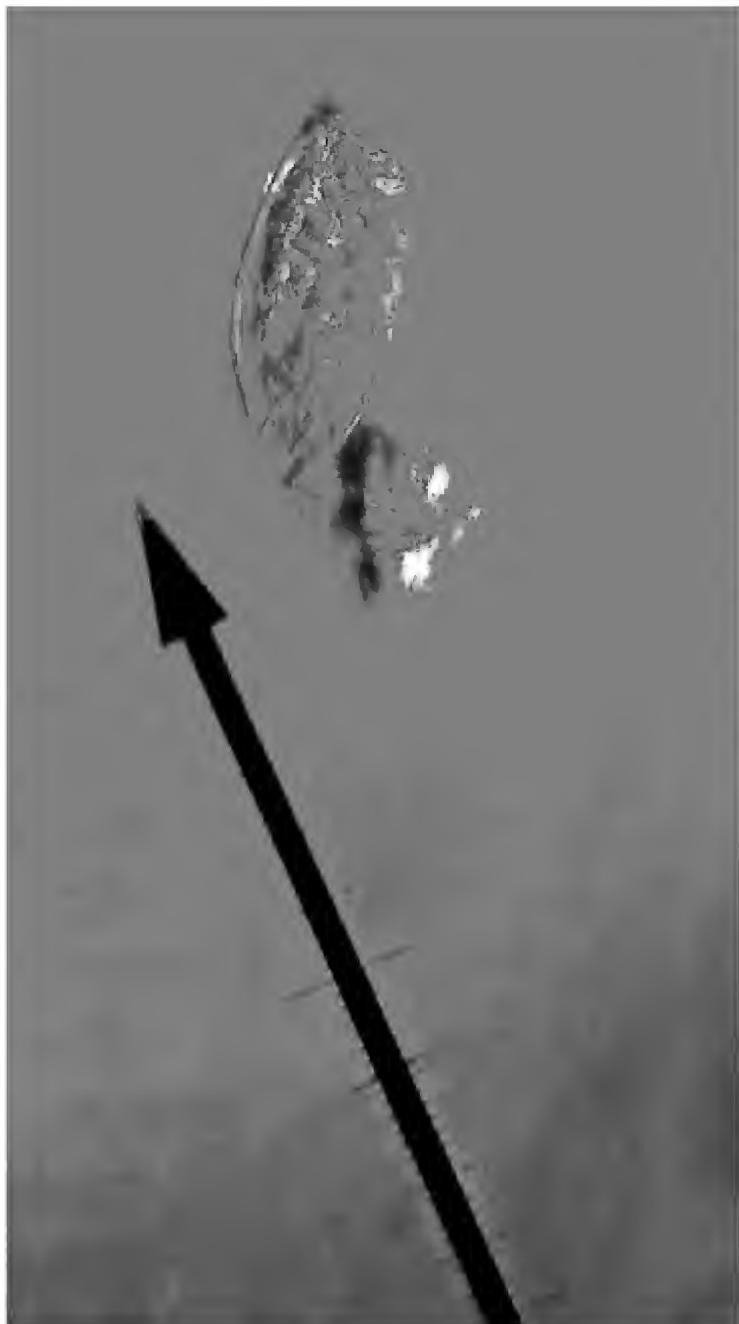
The retinaculum has unusual extensions (legs) that spread outward in a curve and appear to have slightly bulbous ends.

Pollinia apex type: RT

Retinacula type: HU

Caudicle bulb: G

Hoya martinii Kloppenburg & Mendoza
(unpublished) GM #4



Pollinarium enlarged ca.
230x.

Pollinium
length 0.24 mm
widest 0.10 mm

Retinaculum
length 0.07 mm
shoulder 0.05 mm
waist 0.04+ mm
hip 0.05 mm
ext. 0.03 mm

Translator
length 0.05 mm
depth 0.02 mm

Caudicle
bulb 0.02 mm

Translator/caudicle Type:
ls/o

Pollinia end type: F

Caudicle bulb: C ?

Retinacula character: LS

Hoya sp. UC s.n. Taylor

Collected in 1923 at Catobato, Mindoro, Philippines. Roll 101 Album 10 draw #176. A
Section Acanthostemma (Bl.) Kloppenburg species.



A group of pollinia and two pollinarium enlarged about 80x Difficult to get any precise measurements:

Pollinium

length ca. 0.24 mm
widest ca. 0.10 mm

Retinaculum

length ca. 0.08 mm
shoulder ca. 0.05 mm
waist a little narrower
hip as the shoulders.
ex. ca. 0.02 mm

Translator/caudicle type: ls/o

Pollinia inner end type: RT

Caudicle bulb: ?

Retinacula character: S

Hoya unruhiana Kloppenburg, Siar, Mendoza, Cajano, Guevarra & Carandang 2013. ISSN 1055-4564 Type clone



Pollinium

length	0.24 mm
widest	0.11 mm

Retinaculum

length	0.09 mm
shoulder	0.07 mm
waist	0.04 mm
hip	0.05 mm
ext	0.02 mm

Translator

length	0.04 mm
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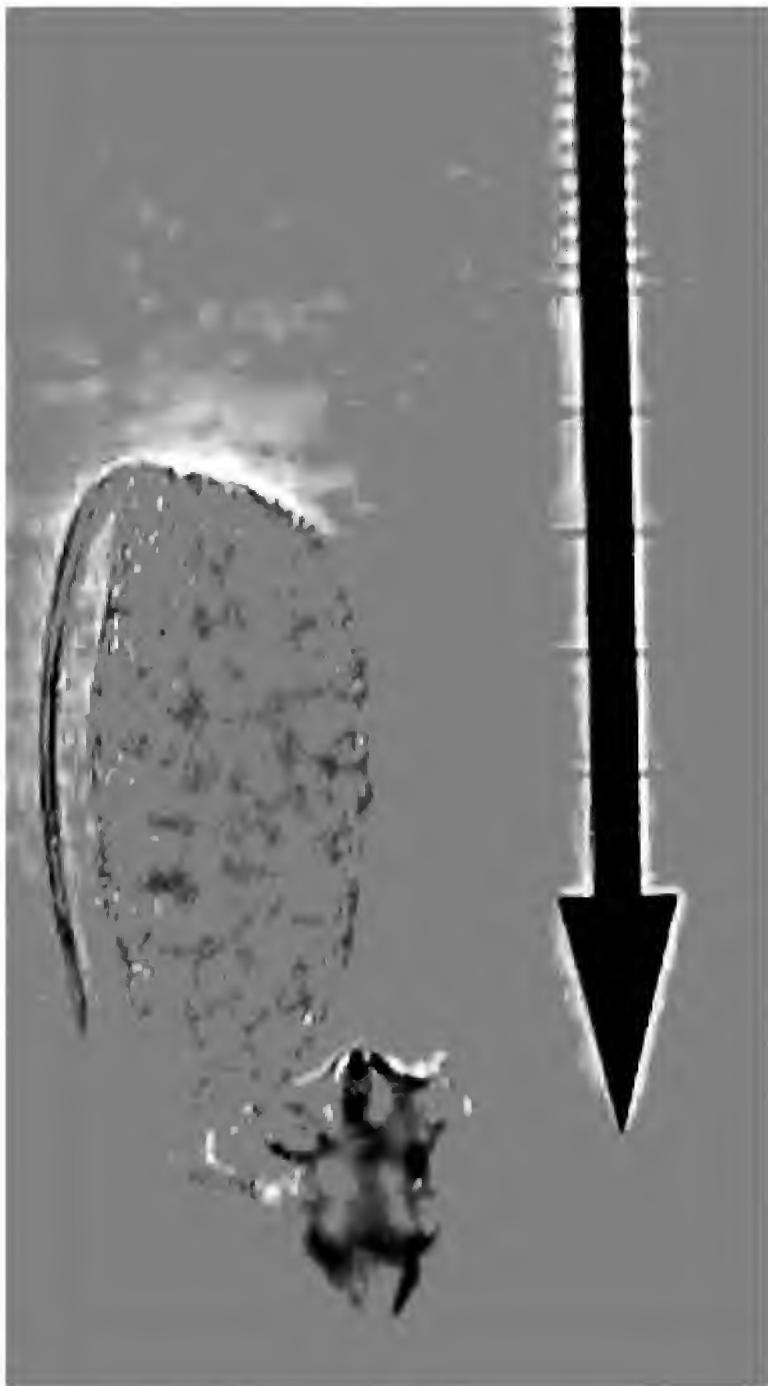
Caudicle bulb diam. 0.02 m

Retinacula type: S

Pollinia inner end: R

Translator/caudicle: ls/o

***Hoya subrosea* subsp. *inawaensis* Kloppenburg & Mendoza**
(unpublished) GM #168



Pollinium enlarge 200x.

Pollinium

length	0.23 mm
widest	0.14 mm

Retinaculum

length	0.08 mm
shoulder	0.12 mm
waist	0.05 mm
hip	0.08 mm
ext.	0.04 mm

Translator

length	0.07 mm
widest	0.02 mm

Caudicle

bulb diam.	0.04 mm
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Translator/caudicle Type:
ls/o

Pollinia apex type: R

Caudicle bulb: G

Retinacula character: HU

Pollinia Types 2017-1D
ls/o (cont.)

271. **Hoya bifunda** Klopp., Siar, Cajano, Guevarra & Carandang 2013
272. **Hoya cupa** Kloppenburg & Mendoza
273. **Hoya capotoanensis** Kloppenburg 2015
274. **Hoya capotoanensis** subsp. **quezonensis** Kloppenburg & Mendoza
275. **Hoya carandangiana** Kloppenburg & Siar 2015
276. **Hoya minipollinia** Kloppenburg & Cajano
277. **Hoya parvapollinia** Kloppenburg & Mendoza
278. Hoya sp. **Avala Ridge Hoya betchei ?** Tutuila, American Samoa an odd type

Hoya bifunda Kloppenburg, Siar, Cajano, Guevarra & Carandang
2013

Pollinaria enlarged ca. 290x



Pollinium

length 0.23 mm
widest 0.10 mm

Retinaculum

length 0.06 mm
shoulder 0.06 mm
waist 0.04 mm
hip 0.05 mm
ext. 0.03 mm

Translator

length 0.06 mm
depth 0.02 mm

Caudicle

bulb 0.02 mm

Type: C

Translator/caudicle type: ls/o

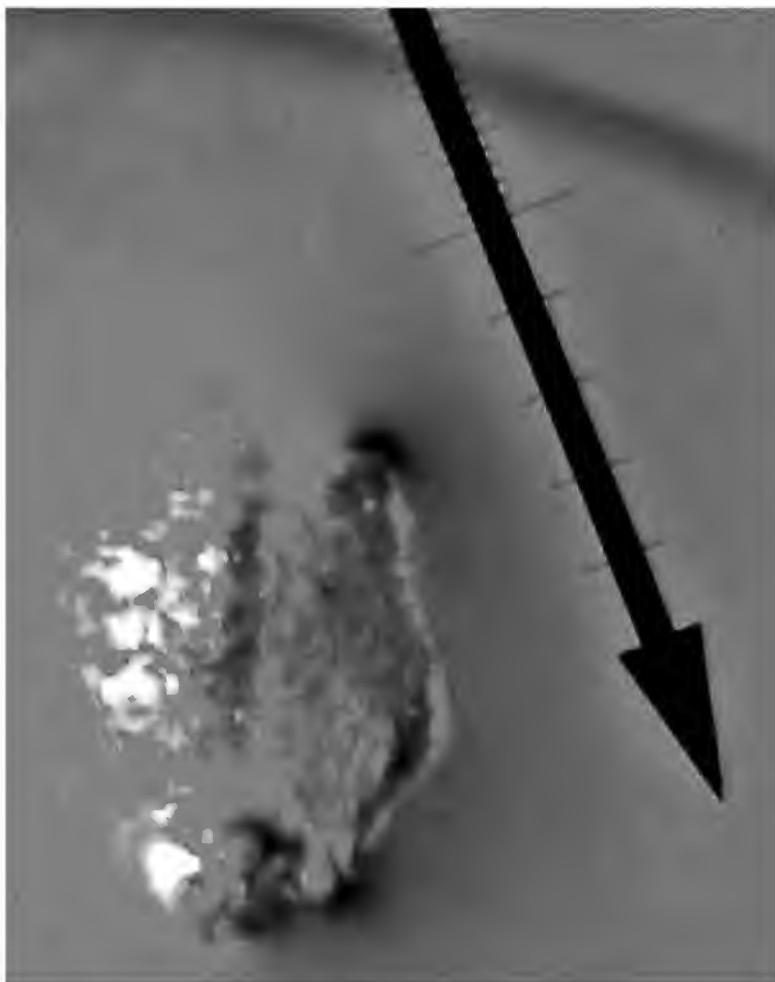
Pollinia inner end type: R

Ratios: p/w 2.3

p/r 3.8

Retinacula character: HU

***Hoya cupa* Kloppenburg & Mendoza**
(unpublished) GM #94



Pollinarium
enlarged ca. 240x.

Pollinium

length	0.23 mm
widest	0.12 mm

Retinaculum

length	0.06 mm
shoulder	0.06 mm
waist	0.05 mm
hip	0.06 mm
ext.	0.01 mm

Translator

length	0.04 mm
wide	0.03 mm

Caudicle

bulb diam.	0.03 mm
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Translator/caudicle type:
ls/o

Pollinia end type: RT

Caudicle bulb: C ?

Retinacula character: S ?

Hoya capotoanensis Kloppenburg 2015
Edano (PNH) 15642, 1952, Mt. Capotoan, Samar, Philippines.
ISSN 10055-4564



Pollinarium enlarged about 80x

Pollinium

length	0.22 mm
widest	0.05 mm

Retinaculum

length	0.15 mm
shoulder	0.10 mm
waist	0.06 mm
hip	0.08 mm
ext	0.03 mm.

Translators

length	0.07 mm ca.
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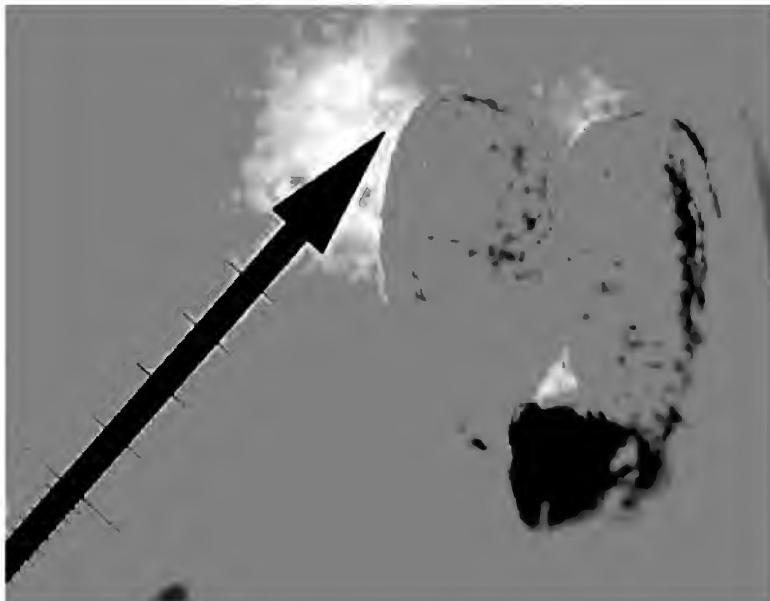
Translator/caudicle type: ls/o

Pollinia end type: R

Caudicle bulb: ?

Retinacula character: S

Hoya capotoanensis subsp. quezonensis Kloppenburg & Mendoza
(unpublished)
GM #207



Pollinaria enlarged ca.
180x.

Pollinium		Translator/caudicle type: ls/o
length	0.22 mm	
widest	0.12 mm	
Retinaculum		Pollinia inner end type: R
length	0.07 mm	
shoulder	0.08 mm	
waist	0.06 mm	
hip	0.07 mm	Retinacula: HU "hands up"
ext.	0.03 mm	
Translator		Caudicle type: C
length	0.04 mm	
widest	0.02 mm	
Caudicle		
bulb diam.	0.03 mm	



Pollinaria enlarged about 190x These are extremely small Pollinia. They were difficult to extract, very loose in positions, the vacuole (clear) area in front of pellucid edge is relatively wide, pellucid edge extends to the inner apex.

Pollinium

length	0.21 mm
widest	0.09 mm

Translator

Retinaculum

length	0.07 mm
shoulder	0.09 mm
waist	0.06 mm
hip	0.07 mm

length	0.05 mm	ext.	0.01 mm
depth	0.01 mm		

Ratio: pol./ wide 2.3 Pol./ret. 2.6

Caudicle	
bulb diam.	0.03 mm

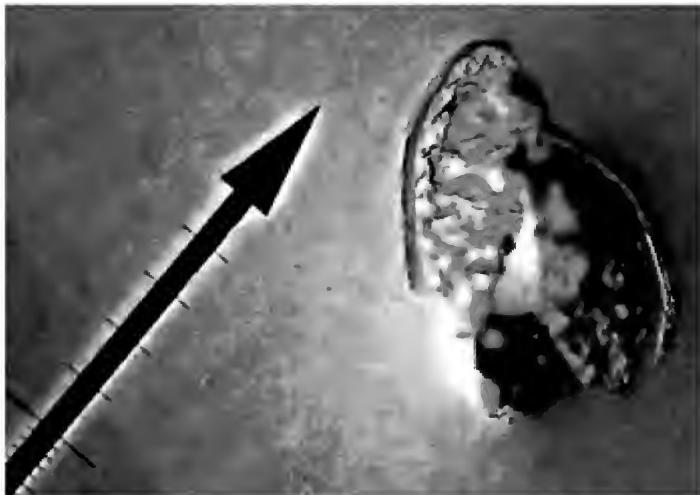
Translator/caudicle type: ls/o.

Pollinia inner apex type: RT

Caudicle bulb: C ?

Retinacula character: S

Hoya minipollinia Kloppenburg & Cajano
sp. AC #003
(unpublished)



Pollinaria enlarged
160x.

Pollinium

length	0.15 mm
widest	0.11 mm

Retinaculum

length	0.07 mm
shoulder	0.09 mm
hip	0.07 mm
ext.	0.03 mm

Translator

length	0.08 mm
widest	0.03 mm

Translator/caudicle type: ls/o most likely.

Pollinia end: T

Caudicle bulb: ?

Retinacula character: S

Retinaculum enlarged 230x to show more details, although still not very sharp! Most likely the caudicles are oval shaped so the translator/caudicle type will be “ls/o” and the pollinia ends are tapered “T”



***Hoya parvapollinia* Kloppenburg & Mendoza**
(unpublished) GM # GM #46



Pollinarium enlarged ca. 230x. Here the right pollinium is turned inward on its axis, and the retinacula is also turned so the head is turned outward (reversed). This is a small pollinarium.

Pollinium

length 0.12 mm
widest 0.10 mm

Retinaculum

length 0.08 mm
shoulder 0.07 mm
waist 0.05 mm
hip 0.06 mm
ext. 0.03 mm

Translators

length 0.05 mm
depth 0.01 mm

Caudicle

bulb diam. 0.05 mm

Translator/caudicle Type: ls/o

Pollinia end type: T

Caudicle bulb: G ?

Retinacula character: S

Avala Ridge Hoya betchei ?

Tutuila, American Samoa



Pollinarium enlarged about 165x. The pollinia are long and narrow, translator arms short triangular. The arms and caudicle seem to enter the retinaculum near its waist.

Pollinia

length	0.72 mm
widest	0.24 mm

Inner ends: F

Retinacula

Type: S ?

length	0.26 mm
Shoulder	0.12 mm
waist	0.08 mm
hip	0.10 mm

Translators		Translator/caudicle type: ld/o
length	0.14 mm	
widest	0.05 mm	

Caudicle bulb diam. 0.07 mm **Type:** C

I added this here but it is unusual in a number of respects and difficult to categorize.

Pollinia Types 2018

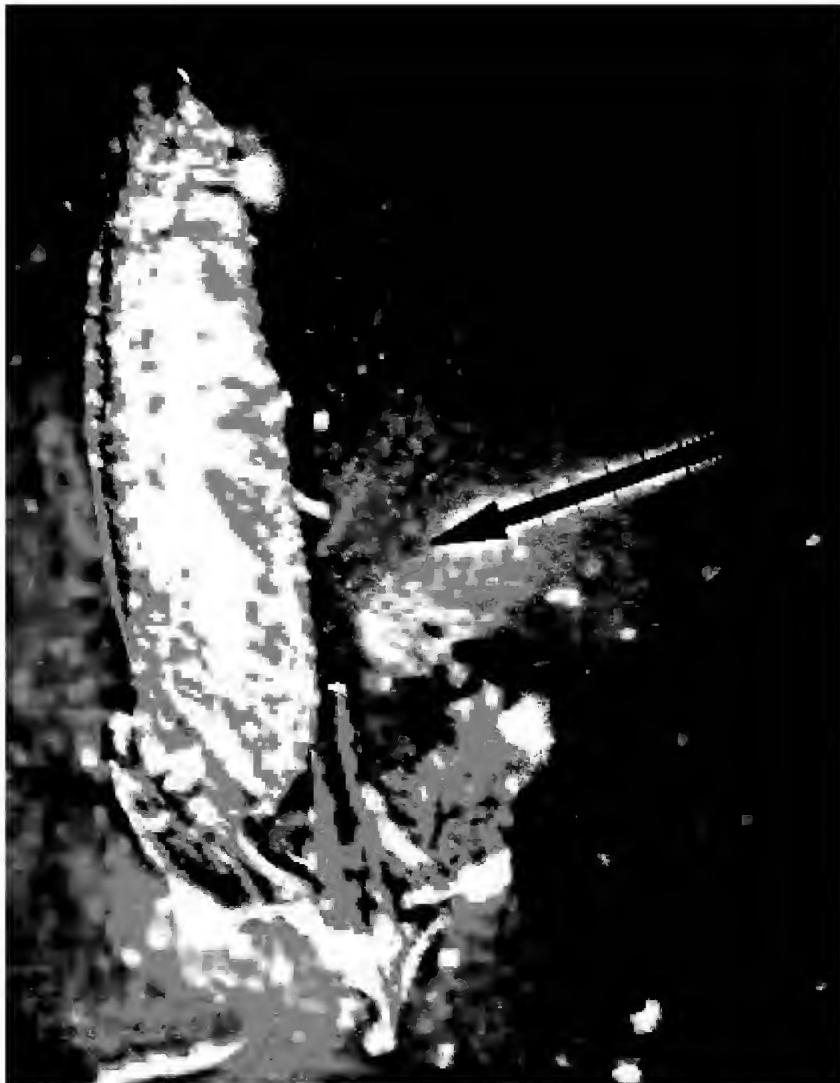
fb/cw or l/cw or fb/o

1. **Hoya imbricata subsp. megapollinia** Kloppenburg 2014
2. **Hoya elliptica**
3. **Hoya coriacea** Blume 1826
4. **Hoya apoensis subsp. sagittaria** Kloppenburg, Siar & Ferreras 2010
5. **Hoya imbricata forma basisubcordata** Koorders
6. Hoya cf. coriacea Toba TG
7. **Hoya halconensis** NS05-225
8. **Hoya darwinii subsp. mabilogensis** Kloppenburg & Mendoza
9. Hoya celata Klopp., Siar, Mendoza et al 2013
10. **Hoya buotii** Kloppenburg 2002
11. Sp. NS05-231
12. **Hoya fraterna** Blume 1849
13. **Hoya linavergarae** Kloppenburg & Siar 2006
14. **Hoya bella** Hooker 1848
15. **Hoya weebella** Kloppenburg 2005
16. Hoya sp. MT 13
17. **Hoya acicularis** Green 2002
18. Hoya darwinii subsp. minora Kloppenburg & Mendoza
19. Hoya sp. UPLB 50
20. **Hoya imbricata subsp. lagunaensis** Kloppenburg & Mendoza
21. **Hoya kloppenburgii** Green 2001
22. **Hoya imbricata** Decaisne 1844
23. **Hoya campanulata** Blume 1826
24. Hoya imbricata subsp. sulawesiensis (unpublished)
25. **Hoya caudata** Hooker f. 1883
26. **Hoya benitotanii** Kloppenburg & Siar 2010
27. **Hoya loheri** Kloppenburg 1991
28. **Hoya lucyae** Kloppenburg & Siar 2006
29. **Hoya edwinofernandoi** Kloppenburg, Cajano & Hadsall 2015
30. **Hoya anncajanoae** Kloppenburg & Siar 2008
31. Hoya sp. IML 557
32. **Hoya lanceolata** Wallich ex Don 1825
33. **affinis Hoya rumphii**
34. **Hoya cystiantha** Schlechter 1913
35. **Hoya wayetii** Kloppenburg 1993
36. **Hoya linearis** Wallich 1825
37. **Hoya maxima** (Karst.) Warburg 1907
38. **Hoya williamoliveriana** Kloppenburg, Cajano & Hadsall 2015
39. **Hoya merrillii** Schlechter 1904
40. **Hoya bicknellii** Kloppenburg 1999
41. **Hoya chiekoae** Kloppenburg, Ferreras & Mendoza 2012
42. **Hoya kentiana** Burton 1991
43. **Hoya obtusata** Kloppenburg & Mendoza

44. ***Hoya quadrata*** Kloppenburg
45. ***Hoya rosarioae*** Kloppenburg & Siar 2915
46. ***Hoya* sp. NS-0009**
47. ***Hoya micrantha*** Hooker f. 1883
48. ***Hoya rizaliana*** Kloppenburg 1991
49. ***Hoya burtoniae*** Kloppenburg 1990
50. ***Hoya rhodostella*** Ridley 1923
51. *Hoya imbricata* subsp. mottled leaf from Palawan 93961
52. ***Hoya anncajanoae* subsp. *lagyoensis*** Kloppenburg & Mendoza
53. ***Hoya kanlaonensis*** Kloppenburg, Siar & Ferreras 2010
54. ***Hoya myrmecopa*** Kleijn and Donkelaar 1999
55. ***Hoya* sp. NS00-004**
56. ***Hoya obscura*** Elmer ex Burton 1986
57. ***Hoya* sp.** Edano/Gutierrez (PNH) 37800 1957
58. ***Hoya affina*** Kloppenburg & Mendoza
59. ***Hoya* sp.** PNH 4936 Gaerlan & Fuentes
60. ***Hoya scortechinii*** King & Gamble 1908
61. ***Hoya wayetii* subsp. *lagyoensis*** Kloppenburg & Mendoza
62. ***Hoya litoralis*** Schlechter 1905
63. ***Hoya ignota*** Kloppenburg, Siar & Cajano
64. ***Hoya nummularioides*** Constantin 1912
65. ***Hoya panayensis*** Kloppenburg & Siar 2009
66. ***Hoya lacunosa*** Blume 1826
67. ***Hoya brevialata*** Kleijn & Donkelaar 2001
68. ***Hoya santafeensis*** Kloppenburg & Mendoza 2015
69. ***Hoya rima*** Kloppenburg, Mendoza & Ferreras 2014
70. *Hoya* sp. UC 424
71. ***Hoya sipayangensis*** Kloppenburg & Wiberg 2002
72. ***Hoya burtoniae*** Kloppenburg 1990
73. ***Hoya poolei*** White & Francis 1928
74. ***Hoya geotropa*** Kloppenburg & Mendoza
75. ***Hoya tangerina*** Kloppenburg, Mendoza & Ferreras 2014
76. ***Hoya papaschonii***
77. ***Hoya apoensis* subsp. *sagittaria*** Kloppenburg, Siar & Ferreras 2010
78. ***Hoya mitisa*** Kloppenburg & Mendoza
79. ***Hoya eitapensis*** Schlechter 1909
80. ***Hoya pseudolittoralis*** Norman 1937
81. ***Hoya pseudoleytensis* subsp. *majora*** Kloppenburg & Mendoza
82. ***Hoya davidcummingii*** Kloppenburg 1995
83. ***Hoya corazoniae*** Kloppenburg, Siar & Ferreras 2010
84. ***Hoya setsukokobayashiae*** Kloppenburg & Mendoza
85. ***Hoya tsangii*** Burton 1988
86. ***Hoya krohniana*** Kloppenburg & Siar 2009
87. ***Hoya nummularioides*** Costantin 1912
88. ***Hoya krohniana* subsp. *lalawinanensis*** Kloppenburg & Mendoza
89. ***Hoya apoensis*** Kloppenburg & Siar 2010

90. ***Hoya odetteae*** Kloppenburg 1998
91. ***Hoya taywanensis*** Kloppenburg & Mendoza
92. ***Hoya pseudoleytensis*** Kloppenburg, Mendoza, Guevarra & Carandang 2013
93. ***Hoya acanthocitrina*** Kloppenburg & Mendoza
94. ***Hoya capatata*** Kloppenburg & Mendoza
95. ***Hoya biespada*** Kloppenburg & Mendoza 2015
96. ***Hoya* sp.** Lisa V2
97. ***Hoya realensis*** Kloppenburg & Mendoza

***Hoya imbricata* subsp. *megapollinia* Kloppenburg 2014
sp. CAHUP 8359 (41559)**



Pollinarium with one pollinium missing enlarged about 165x.

Pollinium

length	1.09 mm
widest	0.16 mm

Retinacula

length	0.36 mm
should.	0.10 mm
waist	0.05 mm
hip	0.10 mm
ext.	0.04 mm

Translators

length	0.32 mm
depth	0.06 mm

Caudicle

bulb diam. 0.08 mm

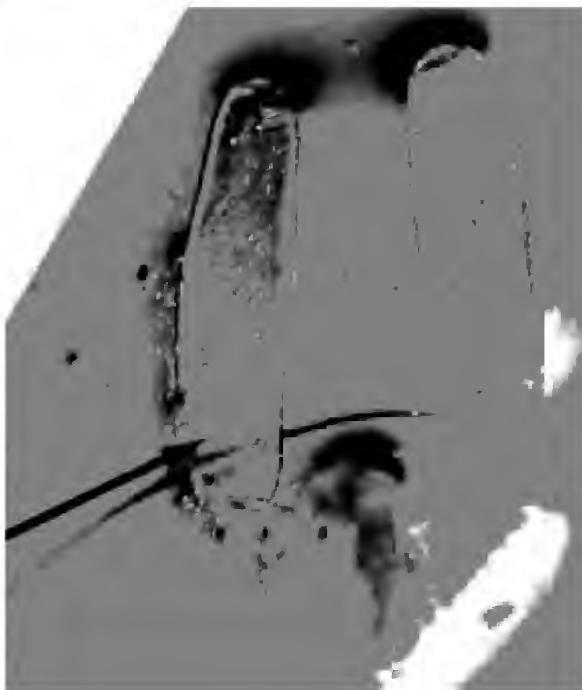
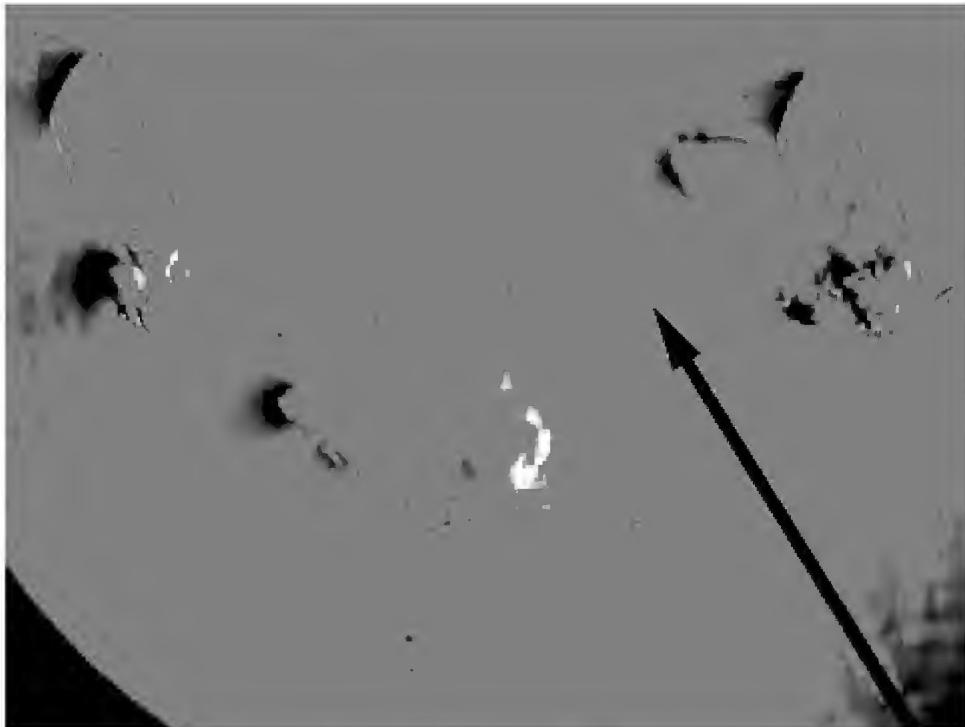
Translator/caudicle type: fb/cw

Pollinia inner end type: R

Retinacula character: E

Ratio: r/p 4.2
p/w 6.8

***Hoya apoensis* var. *sagittaria* Kloppenburg, Siar & Ferreras
2010 Type clone**



Pollinium

length	0.95 mm
widest	0.23 mm

Retinaculum

length	0.40 mm
shoulder	0.15 mm
waist	0.10 mm
hip	0.12 mm
ext.	0.04 mm

Translator

length	0.40 mm
depth	0.04 mm

Caudicle bulb diam. 0.09 mm

Translator/caudicle type: fb/cw
Caudicle bulb: granulate

Pollinia inner end type: R
Retinacula character: E

***Hoya coriacea* Blume 1826**

Flower from Ann Wayman 8/92



This is a photomicrograph of the Pollinarium at only about 65 magnifications. It is large so taken at 165x it is only partial visible. The general features are visible here. The long regular rounded ended pollinia and the long rather linear retinaculum and also the long translator arms supporting the clear bulbous caudicles.

To the right is a photo enlarged about 165 x. This pollinarium is very distinctive. Note that the translators are attached between the waste and hips of the retinaculum, which is long and relatively narrow, the hips already well down the structure. The translator although more densely cellular is not as distinct from the caudicle as in most *hoya*



species, and the caudicle is also cellular like structured. Here it can be seen that the pellucid sterile edge of the pollinia ends inwardly in a apiculate protrusion just above where a orifice exists on the outer edge of the pollinia which allows nectar to enter the pollinium. The translators and caudicles are always attached to the retinaculum in a whole in the side of the retinaculum (an internal attachment).

Pollinaria: Pollinia 1.08 mm long 0.30 mm widest. Retinaculum 0.59 mm long. Caudicle 0.35 mm long. Translator: 0.52 mm long curved.

Pollinia inner end type: R

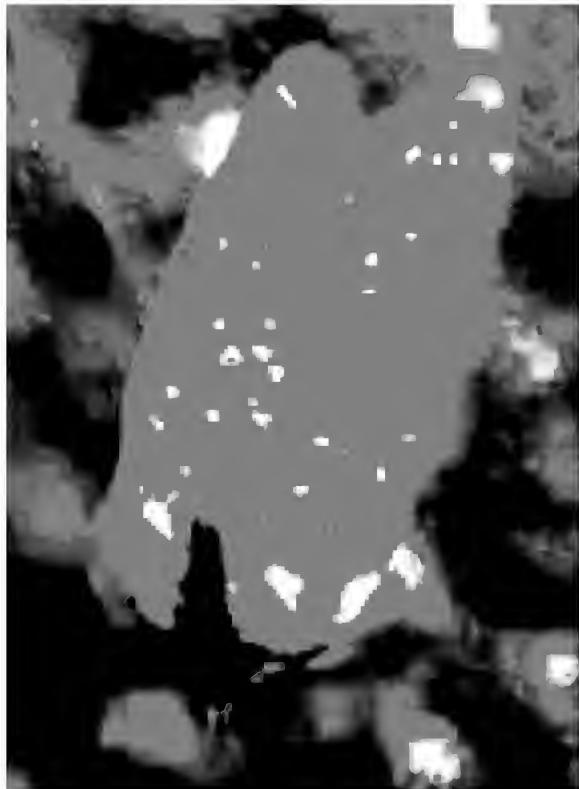
Translator/caudicle type: ls/o

Caudicle bulb: granulate

Retinacula character: E

Hoya imbricata Decaisne 1844

Flower from **forma basisubcordata** Koorders via Maximo Wayet
Baguio, Luzon, Philippines. **Published 2014**



Pollinium

length: 0.93 mm
widest: 0.25 mm

Retinaculum

length: 0.22 mm
shoulder: 0.18 mm
waist: 0.06 mm
hip: 0.13 mm
ext.: 0.050mm

Translators

length: 0.19 mm
depth: 0.09 mm

Caudicle

bulb diam.: 0.11 mm

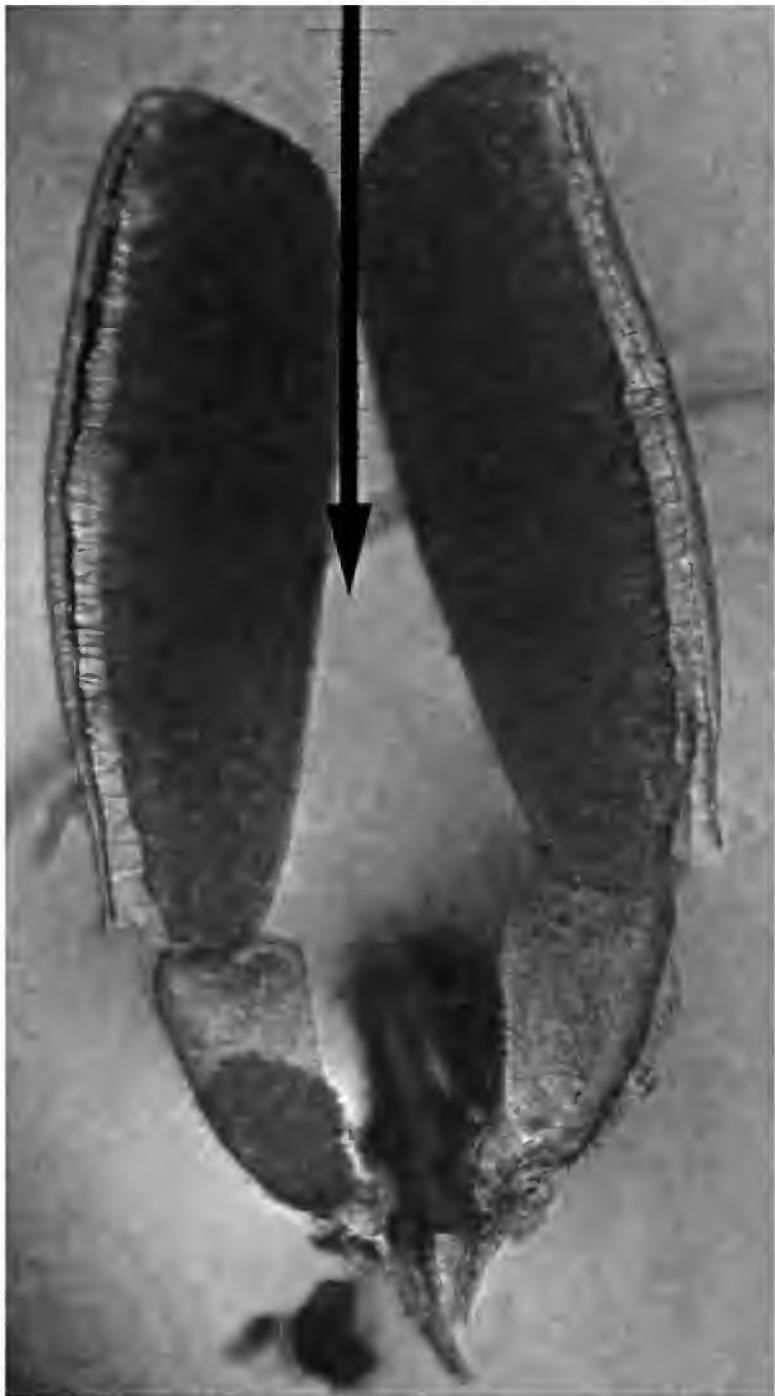
Translator/caudicle type: fb/cw

Pollinia inner end type: RT

Retinacula type: E

Magnified approximately 65x.

Hoya cf. coriacea Toba TG



Pollinaria enlarged ca.
110x.

Pollinium

length	0.90 mm
widest	0.34 mm

Retinaculum

length	0.31 mm
shoulder	0.15 mm
waist	0.09 mm
hip	0.13 mm
extensions	0.09 mm

Translator

length	0.42 mm
wide	0.04 mm

Caudicle

dorsal	0.18 mm
length	0.30 mm

Translator /caudicle type:
ls/cw

Pollinia inner end type:
RT

Retinacular head long and narrow, shoulder area well down, hips with rounded surfaces. Length measurements are made from inner apex to the crotch and do not include the extensions.

Hoya sp. NS05-225 *Hoya halconensis* Kloppenburg
Not *Hoya halconensis*

Flowers given to me in IRI UPLB by Dr. Monina Siar 2006
This is the same sp. as NS05-213



Pollinarium enlarged about 165X. Reticle arrow is 0.10 mm long and head 0.05 mm wide, marks on the stem 0.05 mm long.

Pollinium

length 0.88 mm
widest 0.25 mm

Retinaculum

length 0.30 mm
head 0.14 mm
shoulder 0.15 mm
waist 0.09 mm
hip 0.10 mm
ext. 0.04 mm

Translators

length 0.30 mm
depth 0.02 mm

Caudicle

bulb diam. 0.15 mm

Type: G

Pollinia ends: T

Retinacula: RH



Pollinaria enlarged ca.
80x.

Pollinium

length	0.87 mm
widest	0.40 mm

Retinaculum

length	0.62 mm
widest	0.54 mm
extensions	0.18 mm

Translators

length	0.40 mm
width	0.03 mm

Caudicle Type: G
bulb 0.17 mm

Retinacular extensions
somewhat spade shaped

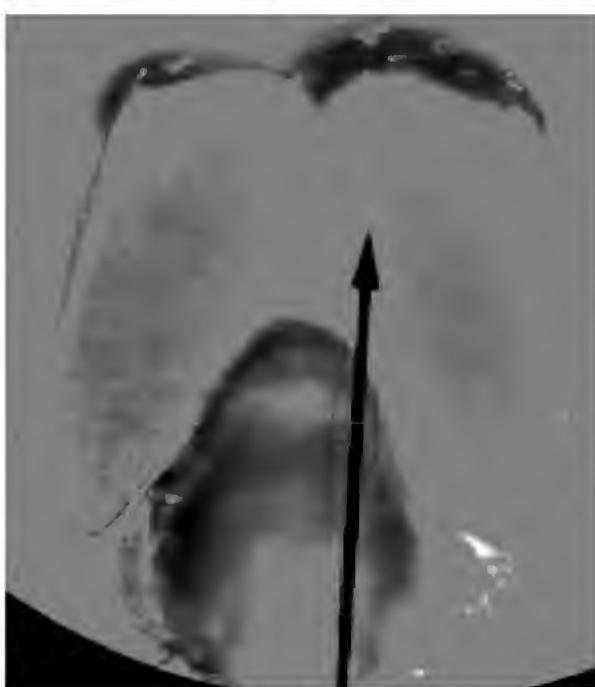


Photo shows the translators and caudicles better.

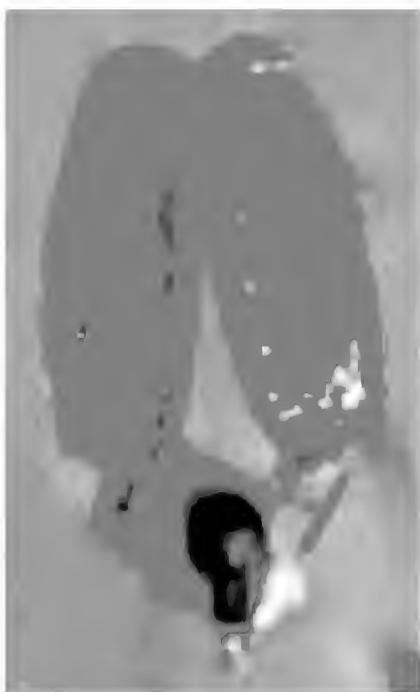
The pellucid edges are short and narrow, difficult to differentiate. The translators are almost intermingled with the “cw” style caudicles that appear somewhat granulate surfaced.

The retinaculum below is creased all the way down the center.

Pollinia apex type: R

Retinacula: R

Hoya buotii Kloppenburg, New Philippine Hoya Species 2002



Pollinarium enlarged about 65x This is a large pollinarium with a small retinaculum, typical of many of Dr. Schlechter's species.

Pollinium

length	0.85 mm
widest	0.30 mm

Retinaculum

length	0.27 mm
shoulder	0.15 mm
waist	0.08 mm
hip	0.10 mm
extensions	0.04 mm

Translators

length	0.35 mm
depth	0.03 mm

Caudicle bulb

diameter	0.13 mm
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Retinacula type: RH

Pollinia inner ends: R

This species has pollinia nearly as long as *Hoya meliflua subspecies fraterna* Green, but the retinaculum is as small as in the species *Hoya lacunosa* Blume.

Hoya sp. NS05-231 Mt. Halcon, Philippines



Pollinaria enlarged about 165x The retinaculum is turned edgewise but appears to have a long head area translator and caudicle entering below the hip area. Translator is very narrow and caudicle bulb surface is cupped (structured). Pollinium is long, narrow and inner apex is rounded.

Pollinium

length	0.81 mm
widest	0.24 mm

Retinacula

length	0.38 mm
shoulders	0.30 mm
waist	0.14 mm
hip	0.18 mm
ext.	0.06 mm

Translator

length	0.33 mm
widest	0.01 mm

Caudicle

bulb diam.	0.15 mm
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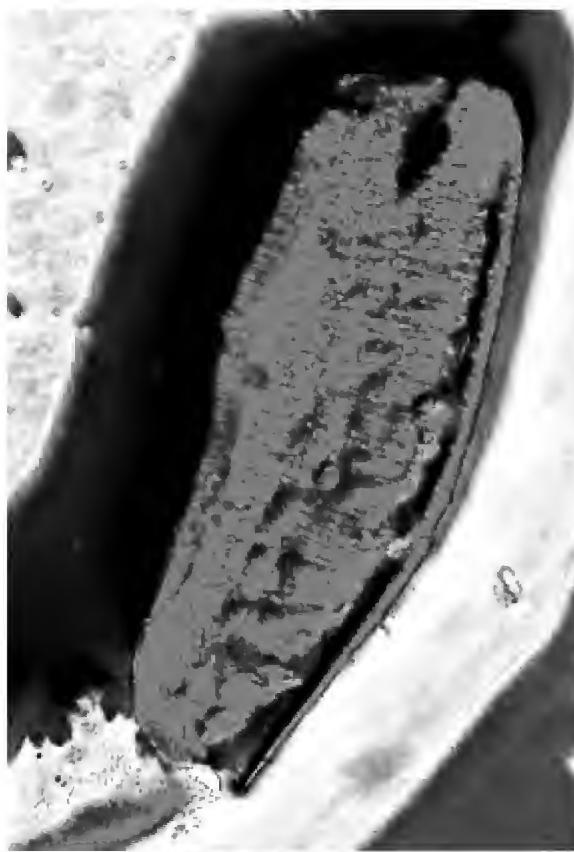
Translator/caudicle type: l/cw

Pollinia inner end type: RT

Hoya fraterna Blume 1849



This is a large pollinarium, here enlarged about 32x. Translator arms are narrow and long attached well down on the retinaculum., actually they seem to run down the side of the retinaculum below the waist to the extensions. Caudicles are club shaped with the wide end near the pollinia base.



View of the pollinia and attachment to the caudicle enlarged about 165x.

Pollinia

length	0.79 mm
widest	0.23 mm

Retinaculum

length	0.35 mm
shoulder	0.14 mm
waist	no differences
hips	no differences
extensions	0.03 mm

Translator

length	0.03 mm
depth	0.02 mm

Caudicle

top	0.15 mm wide
length	0.21 mm without tail.



Translator/caudicle type: l/cw

Pollinia end type: R

Caudicle bulb: G

Retinacula character: HE

Another view showing the translator and caudicle etc. enlarged about ½ the size of the above. Here you can see how the thin translator seems to run down the side to the extensions.

Hoya linavergarae Kloppenburg & Siar 2006
(unpublished)



Pollinaria enlarged about 100x. Lower portion of the pollinium at the pelucid edge is expanded as in *Hoya australis*.

Pollinium

length	0.77 mm
widest	0.32 mm

Retinaculum

length	0.25 mm
shoulders	0.12 mm
waist	0.08 mm
hip	0.12 mm
ext.	0.02-0.06 mm
materian not fully differentiated	

Translators

length	0.19 mm
depth	0.02 mm

Caudicle

bulb diam. 0.08 mm

Ret.: poll ratio 1:2.6

Translator/caudicle type: l/cw

Pollinia end type: R

Retinacula character: HE

***Hoya bella* Hooker 1848**

Plant from San Francisco Flower Mart via David Jones



Photomicrograph of the Pollinaria enlarged approx. 65x. I believe the pollinia are slightly shriveled due to dehydration.

The retinaculum is long and narrow. The clear caudicles are very large and somewhat indented at the top at least on the left side. The translator arms are also rather long and narrow attached well down on the retinaculum.

Pollinaria:

Pollinium

length	0.77 mm
widest	0.22 mm

Retinaculum

length	0.28 mm
shoulder	0.08 mm
waist	0.06 mm
hips	0.09 mm
extensions	0.04 mm

Translators

length	0.28 mm
depth	0.05 mm

Caudicles

diameter	0.10 mm
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Translator/caudicle type: fb/cw

Pollinia end type: T

Caudicle bulb: G

Retinacula character: E

***Hoya weebella* Kloppenburg 2005**

Plant and flower from Chanin Thorut, Bangkok, Thailand. **Type** clone
Species was thought to be *Hoya vaccinioides* Hooker 1883.



Pollinarium:

Pollinia

length	0.77 mm
widest	0.25 mm at the widest.

Retinaculum

length	0.25 mm
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Translator

length	0.27mm
depth	0.06 mm

Caudicle

bulb diam. 0.14 mm but also big on the tail ca. 0.18 mm wide.

Translator/caudicle type:
fb/cw

Pollinia end type: R

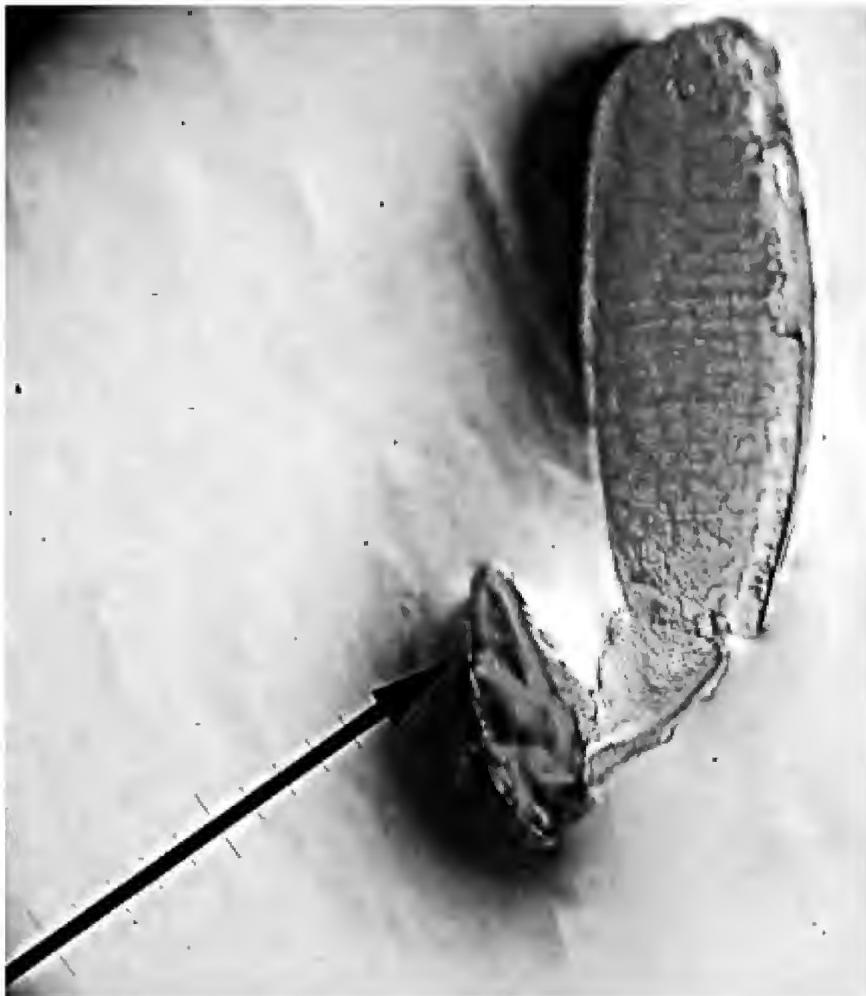
Caudicle bulb: G

Retinacula character: E

This pollinarium is enlarged about 165x in order to show more detail of the translators and caudicles. Note too that a pollen cell has germinated and a rather large pollen tube has emerged through the vacuole and under the split edge of the pellucid margin. As the pollinia absorbs moisture (honeydew) namely from a small orifice at the base of the pellucid margin the pollen grains swell, splitting the edge away along the pellucid margin allowing the pollen tubes to emerge. In this picture you can see the wedge shape of the translator with its wider concave top (here a darker linear structure) supporting the elongated caudicle. Here the caudicle, which in most cases is clear, has some granular structure to it but not nearly as much as the translator has.

Hoya sp. MT. 13

via May Tolentino, Manila, Philippines. 5 flowers in Solution from Torill Nyhuus
3/20/07



Pollinaria enlarged
about 165X.

Pollinium

length	0.76 mm
widest	0.27 mm

Retinaculum

length	0.30 mm
shoulder	0.12 mm
waist	0.10 mm
hip	0.11 mm
ext.	0.01 mm

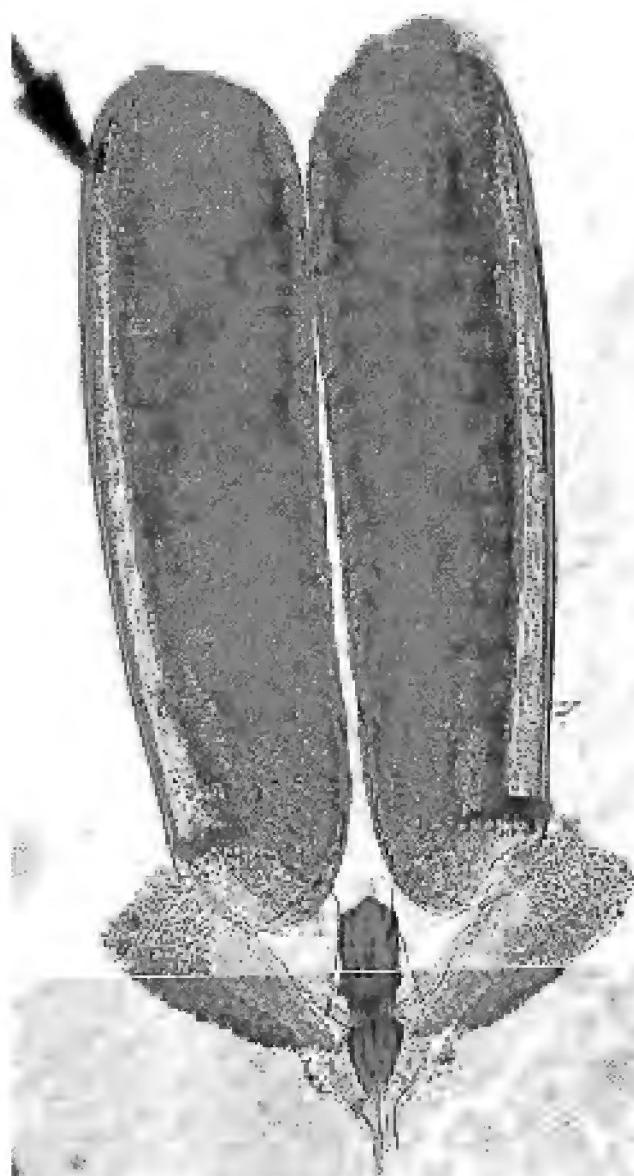
Translators

length	0.22 mm
depth	0.03 mm

Caudicle

bulb diam.	0.16 mm
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***Hoya acicularis* Green 2002**
sp. terete leafed from Danum Valley, Sabah Borneo
Type clone



Pollinaria: Unique!

Pollinia 0.74 mm long; nearly uniform in width 0.19 mm bottom and top rounded evenly. Pellucid edge clean and distinct. vacuole clear widest at base.

Translators 0.22 mm long, clavate shaped extends well beyond the edge of the pollinia, widest at outer apex 0.9 mm wide; attached well down near the hip of the retinaculum.

Caudicles clear, vortex shaped, pollinia in funnel end, top 0.07 mm wide; 0.09 mm long to a point near rectinacular attachment. Bulb ca. 0.15 mm in diameter.

Retinaculum 0.15 mm long including extensions, head rounded with slight shoulder there 0.05 mm wide, waist ca. 0.03 mm wide; hips 0.05 mm extensions about 0.02 mm wide. Center grooved.

Translator/caudicle type: fb/cw

Pollinia inner end type: R

Caudicle bulb: C

Retinacula character: E

***Hoya darwinii* subsp. *minora* Kloppenburg & Mendoza**

(unpublished) GM #110



A rare caudicle type here is the stippled surface looks like a snake skin.

The pellucid edge is short difficult to see clearly here. One thing I noticed is the slight indentation in the retinacular head.

Pollinarium above enlarged ca. 90x, below a second picture focused to show the spade like retinacular extensions.

Pollinia apex type: R

Retinacula character: R

Pollinium

length	0.72 mm
widest	0.43 mm

Retinaculum

length	0.77 mm
widest	0.65 mm
narrowest	0.29 mm
extensions	0.38 cm

Translator

length	0.63 mm
widest	0.10 mm

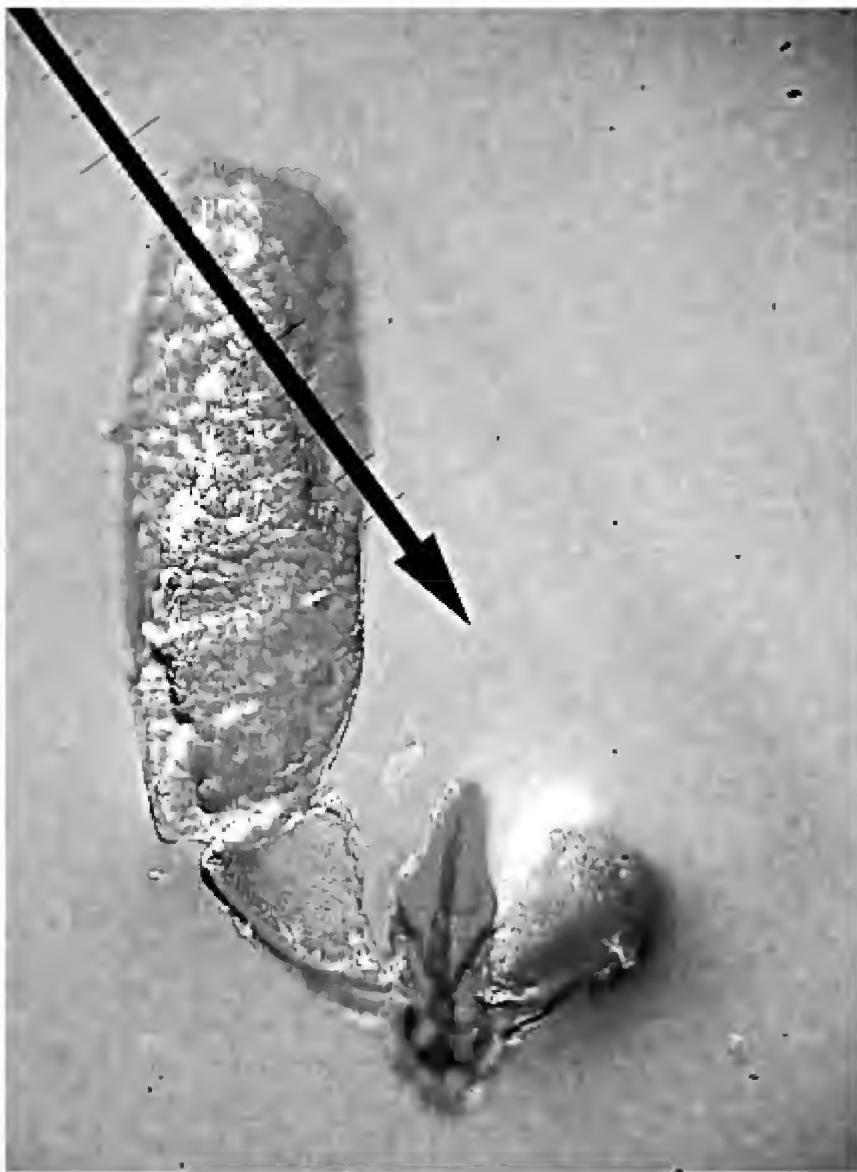
Caudicle

bulb top	0.32 mm
granular G	

Translator/caudicle type: l/cw

Hoya sp. UPLB 50

Flowers in solution from Torill Nyhuus March 2007. Data 15 April 2007



Pollinaria enlarged
about 165x.

Pollinium

length 0.70 mm
widest 0.26 mm

Retinaculum

length 0.29 mm
shold. 0.11 mm
waist 0.05 mm
hip 0.09 mm
ext. 0.03 mm

Translators

length 0.25 mm
depth 0.01 mm

Caudicle is bell shaped with surface texture.

diam. 0.15 mm

Translator/caudicle type: l/cw

Pollinia inner end type: R

Caudicle bulb: G

Retinacula character: HE

***Hoya imbricata* Decaisne 1844**

Flower from TG, Hawaii.

Solid green leafed clone from the Philippines.



The retinaculum is this clone enlarged about 165x. Here we have an entirely different structure than in Central

Pollinia

length	0.68 mm
widest	0.23 mm

Retinaculum

length	0.25 mm
shoulder	0.16 mm
waist	0.10 mm
hip	0.12 mm
ext.	0.11 mm

Translator

length	0.24 mm
depth	0.02 mm

Caudicle

bulb diam. 0.13 mm

Translator/caudicle type: l/cw

Pollinia inner end type: T

Caudicle bulb: G

Retinacula character: LS Unusual head

Note: The retinaculum of this clone has 2 side shelves both ends of which end abruptly (they are not tapered into the main structure. The outer extension has a flared shelf. The head inner end is dentate, more so than with any other observed species.

bulb diam. 0.13 mm

Pollinarium enlarged about 135x. If you want to compare this to a 165x view and have a computer, drag this to 5.5" in length. The pollinia here are not like the Benguet clone and the retinaculum is certainly different from the Sulawesi species and some from Palawan Island. Based on size of flower, pollinia, translators and retinacular structure it appears there are 3 species involved. I believe detailed examination of leaf shape size, structure is warranted.

***Hoya imbricata* subsp. *lagunaensis* Kloppenburg & Mendoza
(unpublished) GM #76**



Pollinaria enlarged ca.
130x.

Pollinium

length	0.67 mm
widest	0.20 mm

Retinaculum

length	0.25 mm
shoulder	0.10 mm
waist	0.05 mm
hip	0.07 mm
ext	0.05 mm

Translator

length	0.24 mm
wide	0.10 mm

Caudicle

bulb	0.10 mm
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Translator/cudicle type:
fb/cw

Pollinia end type: R

Caudicle bulb: G

Retinacula character: E

***Hoya kloppenburgii* Green 2001**



Pollinarium enlarged about 122X. The pollinia are long, here turned edgewise; with a pellucid edge beginning at the outer apex and extending down the side nearly to the inner end accompanied inwardly by a vacuole (neither visible here). The bulbous clear caudicles are compressed somewhat and supported by massive fairly wide and deep translators both of which enter the relatively small retinaculum well down on this structure. The retinaculum has a rounded head and the bifid extensions are flared at their outer ends.

Pollinia	0.66 mm long; 0.23 mm widest.
Caudicles	ca. 0.06 mm diam.
Translators	drumstick like, extended 0.15 mm
Retinaculum	0.07 mm in depth 0.03 mm wide. ca. 0.2.5 mm long including extensions.

Pollinia inner end type: R

Caudicle bulb: G

Retinacula: E

Hoya kloppenburgii

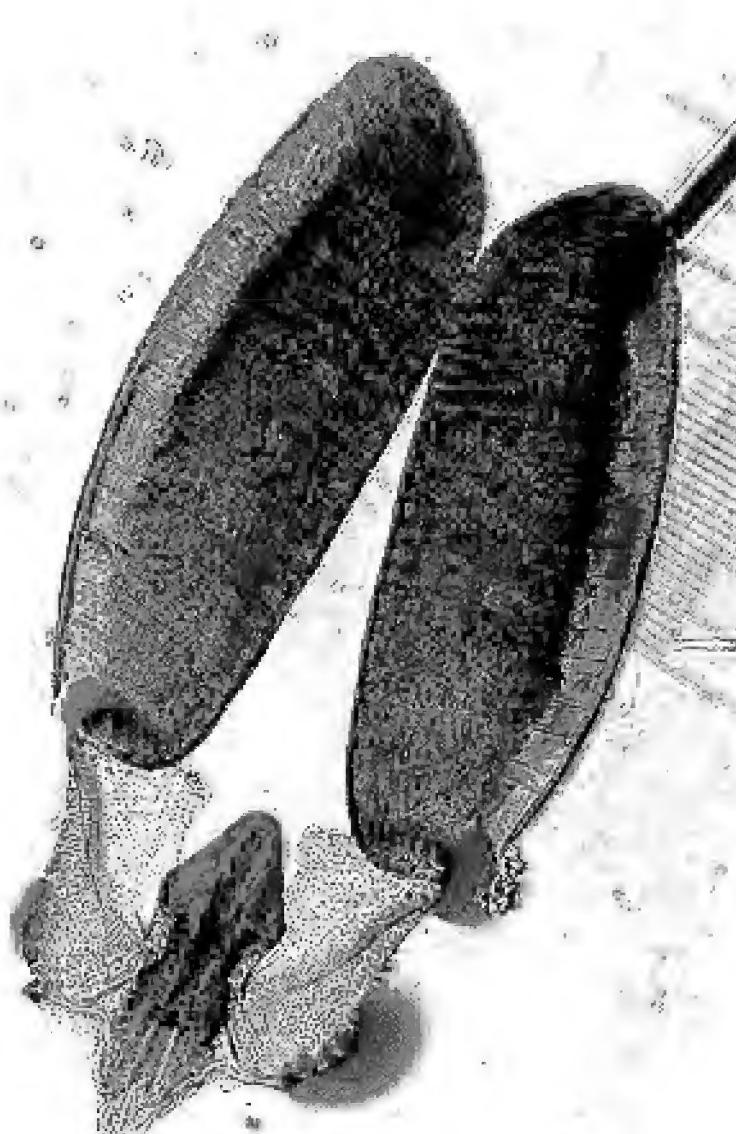


Photo Torill Nyhuus © 2008

SHS

Hoya campanulata Blume 1826

Flowered in Hawaii via Ted Green



Enlarged about 165x

Pollinarium:

Pollinia

length	0.64 mm
widest	0.21 mm

Retinaculum

length	0.30 mm
shoulder	0.10 mm
waist	0.07 mm
hip	0.08 mm
extensions	0.09 mm

Translators

length	0.25 mm
depth	0.06 mm
width	0.02 mm

Caudicle

bulb diam.	0.11 mm
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Translator/caudicle type:
fb/cw

Pollinia inner end type: RT

Caudicle bulb: G (granulate)

Retinacula character: HE

Hoya caudata Hooker f. 1883



Pollinarium enlarged about 165x. The translators are unusual, the lower surface is dark and the structure cups inward with a narrow top supporting the clear comma shaped caudicles. The translator major surface is finely granulose. Pollinia and retinacula are long and narrow.

Pollinia

length	0.62 mm
width	0.16 mm

Caudicle

bulb diam. 0.07 mm

Retinacula character: E

Retinacula

length	0.17 mm
shoulders	0.07 mm
waist	0.05 mm
hip	0.08 mm
extensions	0.03 mm

Translator

length	0.18 mm
depth	0.06 mm

Translator/caudicle type: fb/cw

Pollinia apex type: T

Caudicle bulb: C

***Hoya benitotanii* Kloppenburg & Siar 2010**



Pollinarium enlarged about 165x. The pollinia are very long, translators and caudicles prominent; the retinaculum has a broad head and body with long well developed extensions.

Pollinarium:

Pollinia

length	0.57 mm
widest	0.14 mm

Retinaculum

length	0.07 mm
shoulder	0.06 mm
waist	0.04 mm
hip	0.06 mm
extensions	0.08 mm

Translators

length	0.10 mm.
depth	0.05 mm.
width	0.02 mm.

Caudicle

bulb diam.	0.05 mm
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Ret.:pol. ratio 1:3

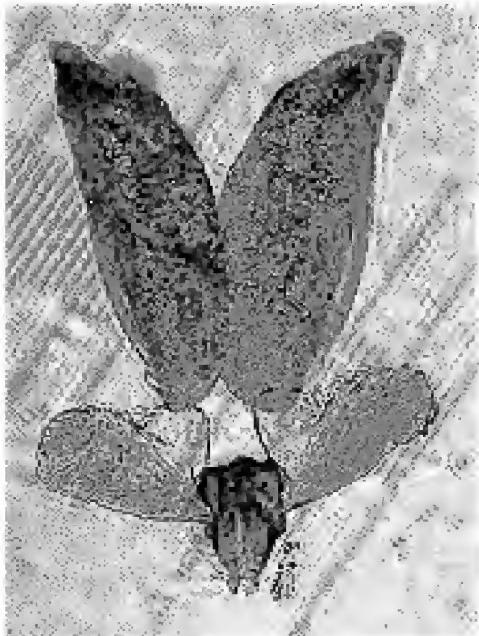
Translator/caudicle type: fb/cw

Pollinia inner end type: T

Caudicle bulb: G

Retinacula character: S

Hoya loheri Kloppenburg 1991 s.n. (UC) 1915 Type clone
Caraballo, Mt. Nueve, Luzon ,Philippines.



Pollinarium of this species is very distinct with a broad Retinaculum, really large translator arms that are widely spread. Both the translators and the clear caudicles are attached at the waste. The pollinia are narrowed toward at the inner end and terminate in a narrow rounded apex. Probably the species with the closest conformation of this pollinarium is found in the Philippine hoyo species *Hoya bilobata* Schlechter.

Magnified approximately 85x.

Pollinium

length	0.56 mm
widest	0.24 mm

Retinaculum

length	0.21 mm
shoulder	0.17 mm
waist	0.09 mm
hip	0.10 mm
ext.	0.06 mm

Translators

length	0.10 mm
depth	0.03 mm

Caudicle ?

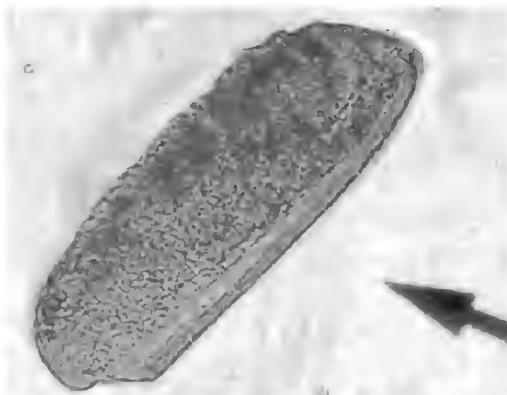
Type: C

Translator/caudicle type: fb/cw

Pollinia apex type: T

Retinacula character: S

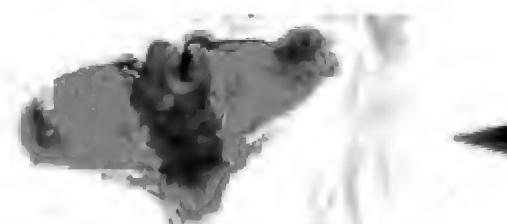
Hoya lucyae Kloppenburg & Siar 2006 Type clone
 sp. #1494 collected by David Bicknell 8 Jan. 1998, Alcoy, Cebu, Philippines.
 Flower cluster sent by David Bicknell from Lilo-an, Cebu, Philippines. Collected
 by David & Luzviminda, January 1998 at Alcoy, Cebu in forest, elevation 500 m.
 epiphytic.



Pollinium enlarged about 165x, very uniform in width the length of the structure, pellucid edge does not reach the lower end.

Pollinium

length	0.55 mm
widest	0.20 mm



Retinaculum, translators and caudicle enlarged as above.

Retinaculum

length	0.19 mm
shoulder	0.08 mm
waist	0.07 mm
hip	0.08 mm
ext.	0.01 mm

Translators

length	0.18 mm
widest	0.08 mm
depth	0.02 mm

Caudicle

bulb diam.	0.07 mm
------------	---------

There are actually two waste areas on the retinaculum and translators enter well down at 2nd waste area.

Translator/caudicle type: fb/cw

Pollinia apex type: T

Retinacula character: S

Hoya sp. IML 557

A hoya species of the Section Acanthostemma (Bl.) Kloppenburg. Material sent by Ann Wayman, Central Point, Oregon from Michael Myrashiro as Sp. nova. Roll 119-120 Drawing # 208. Liddle's catalogue says coll. Sabah. SBC P. Rutherford fl. 9/86. My guess is this may be *Hoya gracilis* Schlechter.



Pollinarium enlarged about 165x. The pollen cells in the pollinia appear to very fine grained, there is a relatively narrow vacuole.

Pollinia

length	0.54 mm
widest	0.20 mm

Retinaculum

length	0.22 mm
shoulder	0.10 mm
waist	0.06 mm
hips	0.10 mm
extensions	0.02 mm

Translator (narrow and long)

length	0.16 mm
depth	0.03 mm ca.

Caudicle

bulb diam.	0.09 mm
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Translator/caudicle type: fb/cw

Pollinia apex type: T

Caudicle bulb: C

Retinacula character: S

***Hoya edwinofernandoi* Kloppenburg, Cajano & Hadsall 2015**

Pollinarium enlarged ca. 250x.



Pollinium
length 0.53 mm
widest 0.25 mm

Retinaculum
length 0.12 mm
shoulder 0.12 mm
waist 0.09 mm
hip 0.10 mm
ext. 0.05 mm

Translator
length 0.24 mm
widest 0.12 mm

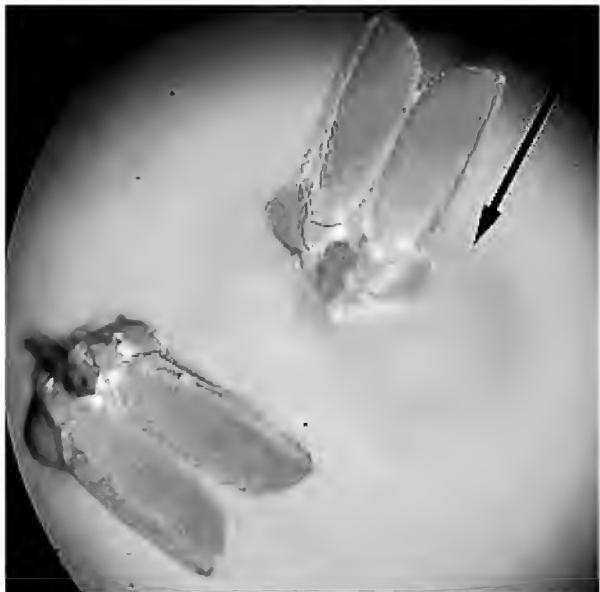
Caudicle
bulb top 0.10 cm

Translator/caudicle
type: fb/cw

Retinacula type: S
(shield)
Caudicle: C

Pollinia inner end type: R (rounded)

Hoya anncajanoae Kloppenburg & Siar 2008



Pollinarium enlarged about 45x.
Fine lines in background above are 0.01 mm wide. Black arrow head is 0.1 mm long, fine lines on shaft are 0.01 mm wide.

Pollinium

length	0.52 mm
widest	0.20 mm

Retinaculum

length	0.12 mm
shoulder	0.09 mm
waist	0.05 mm
hip	0.08 mm
ext.	0.07 mm

Translators

length	0.25 mm
depth	0.02 mm
widest	0.09 mm

Caudicle

bulb diam.	0.11 mm
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Type: C

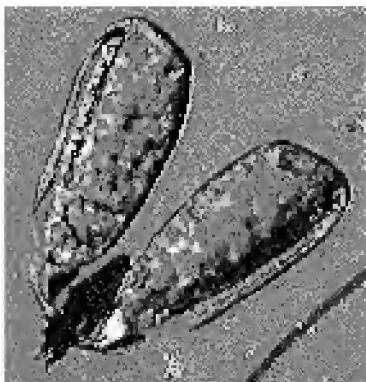
Translator/caudicle type: fb/cw

Pollinia apex type: T

Retinacula character: S

Hoya lanceolata Wallich ex Don 1825

Flower via Torill Nyhuus, Sweden.



Top view of the pollinarium enlarged about 65x.

Compare the pollinia here to *Hoya bella* Hooker.

Here the pollinia are much shorter relatively. The retinacula are both long but this one has a narrowing near and lower apex. Both have well-developed translators (long) and caudicles.

Top view of Pollinarium enlarged about 165x. Note how broad and relatively short the pollinia are, how the pellucid sterile edge does not come near the attached apex, also the large vacuole in from this edge. There are small shoulders on the retinaculum and 2 sets of protrusions lower down (these protrusions I believe are also present in *Hoya bella* Hooker). The translators support a large bulbous end of the caudicle, somewhat triangular in outline in flat view.



Pollinia

length	0.51 mm
widest	0.22 mm

Retinaculum

length	0.27 mm
shoulder	0.09 mm
hip	0.05 mm
waist	0.08 mm
extensions	0.02 mm

Translators

length	0.15 mm
depth	0.02 mm
width	0.02 mm

Caudicle (cone shaped end)
bulb diam. 0.08 mm

Translator/caudicle type:
l/cw

Pollinia apex type: R

Caudicle bulb: G

Retinacula character: HE

Hoya sp. as rumphii



Pollinaria enlarged about 124X. This is relatively a rather small pollinaria. Pollinia are truncate with a well developed pellucid edge. The caudicles are large and the translatore long and not very deep but relatively broad on top supporting the caudicle. Retinaculum is well structured with distinct features.

Pollinia

length	0.49 mm
widest	0.16 mm

Retinaculum

length	0.19 mm overall
shoulder	0.08 mm
waist	0.04 mm
hip	0.08 mm

Translators

length	0.20 mm
depth	0.02 mm
width	0.03 mm

Caudicle

bulb diam.	0.13 mm
extensions	0.04 mm

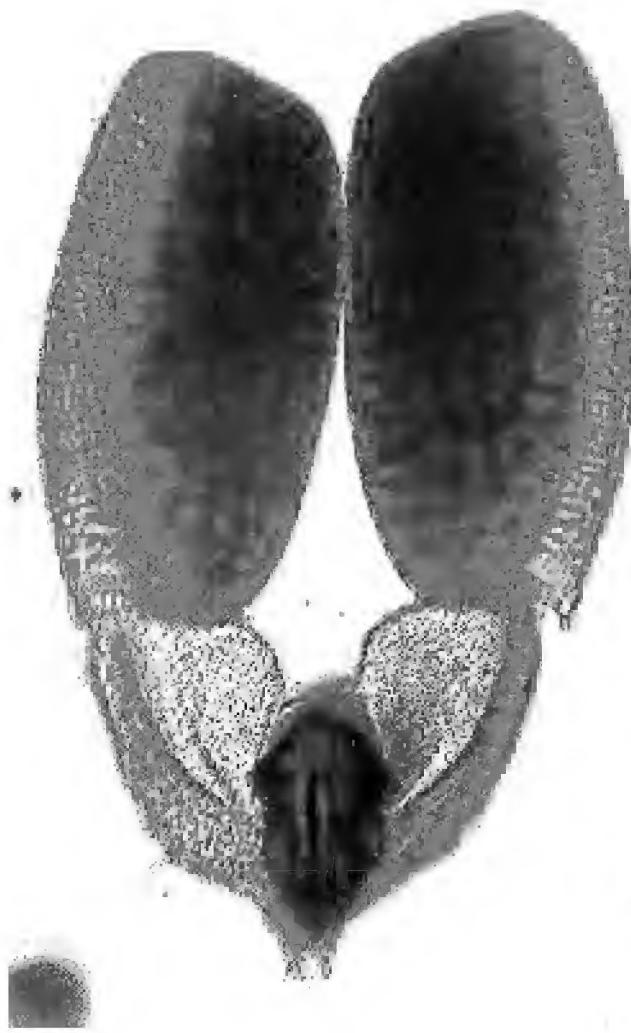
Pollinia inner ends: T

Caudicle: G

Retinacula: S

***Hoya cystiantha* Schlechter 1913**

Flower from Edward Gilding, Pearl City, HI.



Pollinarium enlarged approximately 165x, This is a beautiful structure, very distinctive. I am of the opinion that nearly every species could be delineated by its Pollinarium characteristics.

The pollinia are relatively short and very broad. Note how the pellucid edge cuts off at the end near the caudicle leaving the end slightly protruding. The translators are long and narrow in side view and the caudicles are perfectly formed and large. The caudicles are supported by the translators which are more broad on the top, rather wedge shaped, here you see only the outer edge.

Pollinia

length	0.49 mm
widest	0.23 mm

Retinaculum

length	0.20 mm
shoulder	0.11 mm
waist	0.06 mm
hip	0.10 mm
extensions	0.05 mm

Translators

length	0.25 mm
depth	0.06 mm
width ca.	0.03 mm

Caudicle

bulb diam.	0.11 mm
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Translator/caudicle type: l/cw

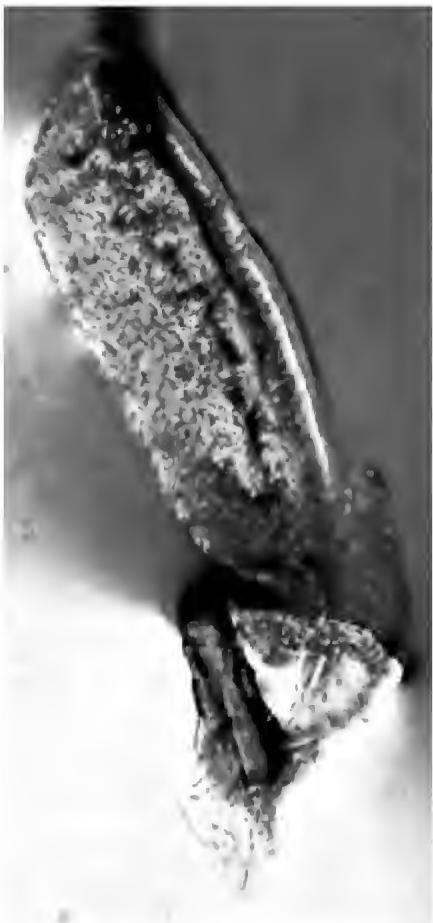
Retinacula character: S

Pollinia inner end type: R

Caudicle bulb: G

Hoya imbricata subsp. sulawesiensis

Not published



Pollinarium form the Sulawesi Green form enlarged about 165x.

Pollinium

length	0.48 mm
widest	0.16 mm

Retinaculum

length	0.19 mm
shoulder	0.08 mm
waist	0.05 mm
hip	0.09 mm
ext.	0.07 mm

Translator

length	0.26 mm
depth	0.06 mm

Caudicle **Type: C**

bulb diam.	0.08 mm
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This clone has an entirely larger pollinarium in most respects, see the data on the mottled leaf form above, from Palawan, Philippines.

Translator/caudicle type: lb/cw

Pollinia inner end: T

Retinacula type: E

Hoya wayetii Kloppenburg 1993
Type clone #90148 flowered in Fresno, CA, USA.



Pollinarium enlarged
approx. 165x.

Pollinium	
length	0.48 mm
widest	0.15 mm

Retinaculum	
length	0.12 mm
shoulder	0.04 mm
waist	0.04 mm
hip	0.05 mm
extensions	0.04 mm

Translators

length	0.19 mm
depth	0.07 mm

Caudicle bulb diam. 0.13 mm
Type: C

Translator/caudicle type: fb/cw
Pollinia inner end type: T

Retinacula character: E

***Hoya linearis* Wallich 1825**

Via Torill Nyhuus



Pollinarium		Caudicle bulb diam.	0.07 mm
length	0.48 mm		
widest	0.19 mm		
Retinaculum			
length	0.16 mm		
shoulder	0.09 mm		
waist	0.04 mm		
hip	0.05 mm		
ext.	0.02 mm		
Translator			
length	0.19 mm		
depth	0.02 mm		

Hoya maxima (Karst.) Warburg 1907
Pollinarium from flower collected in Central Sulawesi 1994.



Magnified approximately 165x.

Pollinium

length:	0.48 mm
widest:	0.16 mm

Retinaculum

length:	0.19 mm
shoulder:	0.18 mm
waist:	0.05 mm
hip:	0.09 mm
ext.:	0.07 mm

Translator

length:	0.26 mm
depth:	0.06 mm

Caudicle

bulb diam.:	0.08 mm
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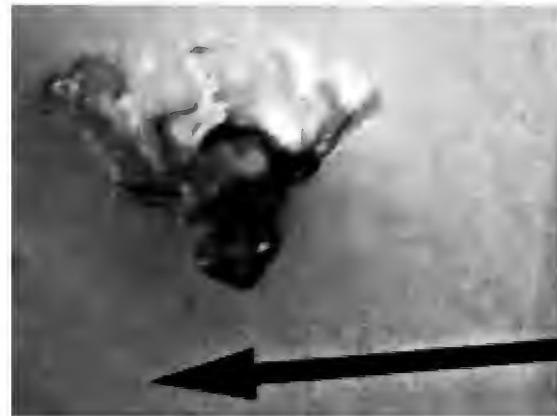
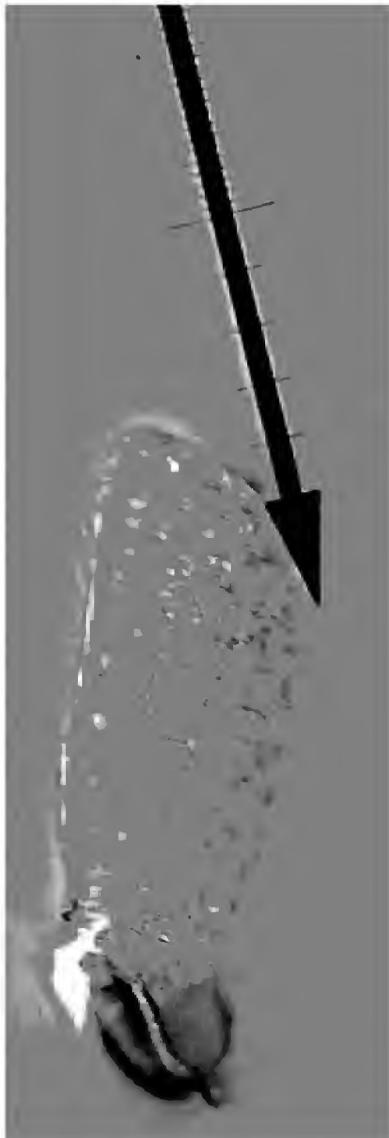
Translator/caudicle type: fb/cw

Pollinia inner end type: T

Caudicle bulb: C

Retinacula character: E

***Hoya williamoliveriana* Kloppenburg, Cajano & Hadsall 2015
V-5 #2**



Both photos of the pollinaria enlarged near 140x.

Pollinium

length	0.48 mm
widest	0.20 mm

Retinaculum

length	0.13 mm
shoulder	0.10 mm
waist	0.06 mm
hip	0.08 mm
ext.	0.02 mm

Translator

length	0.15 mm
wide	0.02 mm

Caudicle

bulb diam;	0.06 mm
------------	---------

Type: C (clear)

Translator/caudicle type: l/cw ? **Pollinia inner end type:** F **Retinacula type:** R

Hoya merrillii Schlechter 1904

900307



Pollinarium

length	0.47 mm.
widest	0.19 mm.

Retinaculum

length	0.12 mm.
shoulder	0.13 mm.
waist	0.09 mm.
hip	0.12 mm.
extensions	0.11 mm.

Translators

length	0.15 cm.
widest	0.11 mm.

Caudicle bulb 0.06 mm.

Translator/caudicle Type: fb/cw ?

Pollinia inner end type: T

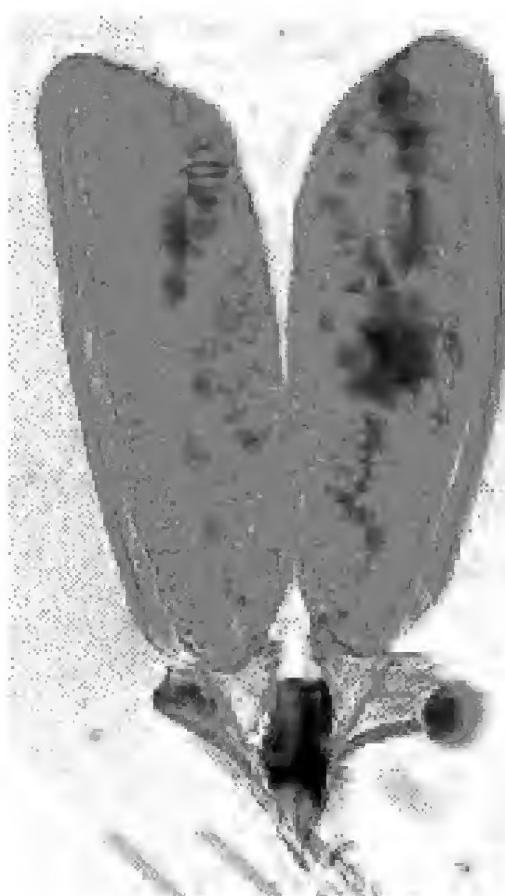
Caudicle bulb: G

Retinacula character: S

Retinacula character: S

***Hoya bicknellii* Kloppenburg 1999**

Flowers from Type clone via David Bicknell.



Pollinaria

Photomicrograph approx. 165x.

Note: The thickened wedge-shaped translator arms. The bulbous shaped caudicles connected to the retinaculum at its waist. The elongated pollinia, rounding outward at the inner apex, stuck to the bulbous caudicles at the inner apex. That the sterile pellucid outer edge of the pollinia do not extend to the inner (lower) apex. That the sterile edge extends over the outer apical area of the pollinia.

Pollinaria: Somewhat narrow, long Pollinia long and oval, tapering inward at upper apex (inner), length 0.46 cm.. rather uniform in width, widest 0.15 cm. Prominent opaque sterile edge. Most similar to the pollinium of *Hoya micrantha* Hooker f.

Retinaculum

length	0.15 cm (very long pointed ends).
head	0.05 cm
waste	0.04 cm
hips	0.06 cm

Translators, drumstick shaped

length	0.15 cm
widest outer end.	0.06 cm

Caudicles clear, sticky

bulbous ca. 0.07 mm long and as wide.

Type: G

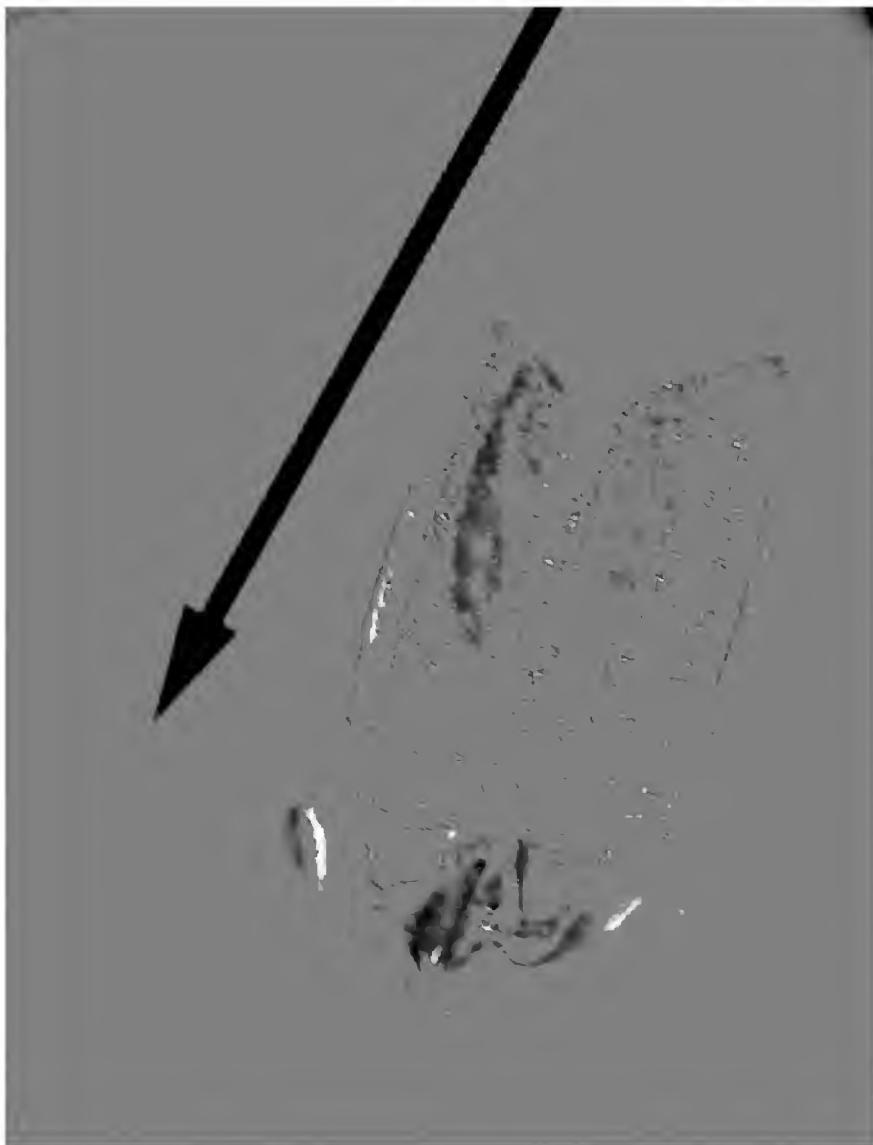
Translator/caudicle type: fb/cw

Caudicle bulb: G

Pollinia end type: T

Retinacula character: S

***Hoya chiekoae* Kloppenburg, Ferreras & Mendoza 2012**



Pollinarium:
Enlarged ca. 160x.

Pollinium
length 0.45 mm
widest 0.14 mm

Retinaculum
length 0.10 mm
shoulder 0.06 mm
waist 0.05 mm
hip 0.06 mm
ext. 0.03 mm

Translators
length 0.20 mm
depth 0.03 mm

Caudicle
bulb diam. 0.07 mm

Translators should most likely be classified as perpendicular "p".

Ratios: p/ret 4.5 p/w 3.2

Translator/caudicle type: fb/cw

Pollinia inner apex type: F

Caudicle bulb: C

Retinacula character: S

Hoya kentiana Burton 1991

Pollinarium from clone Perpich 428 via Ted Green, Kaaawa, HI. USA.



The pollinarium enlarged approx. 165 times. Compare this with other pollinarium and you will find many distinct differences in the species. Here the usually clear caudicles seem impregnated with fine granular material or cellular structure. The translator arms are well formed more darkly granular and from the left end you can discern that this structure has a conceived top which is broad enough to support the caudicles, both structures are attached well down on the dark retinaculum a

at the waist area. The pollinia are tapered inward at the inner apex and the pellucid sterile edge extends down the side to near the point where the pollinia are sunken into the caudicle, just in front of this edge is a long vacuole.

Pollinium

length:	0.45 mm
widest:	0.15 mm

Retinaculum

length:	0.15 mm
shoulder:	0.08 mm
waist:	0.05 mm
hip:	0.10 mm
ext.:	0.04 mm

Translators

length:	0.21 mm
depth:	0.05 mm

Caudicle

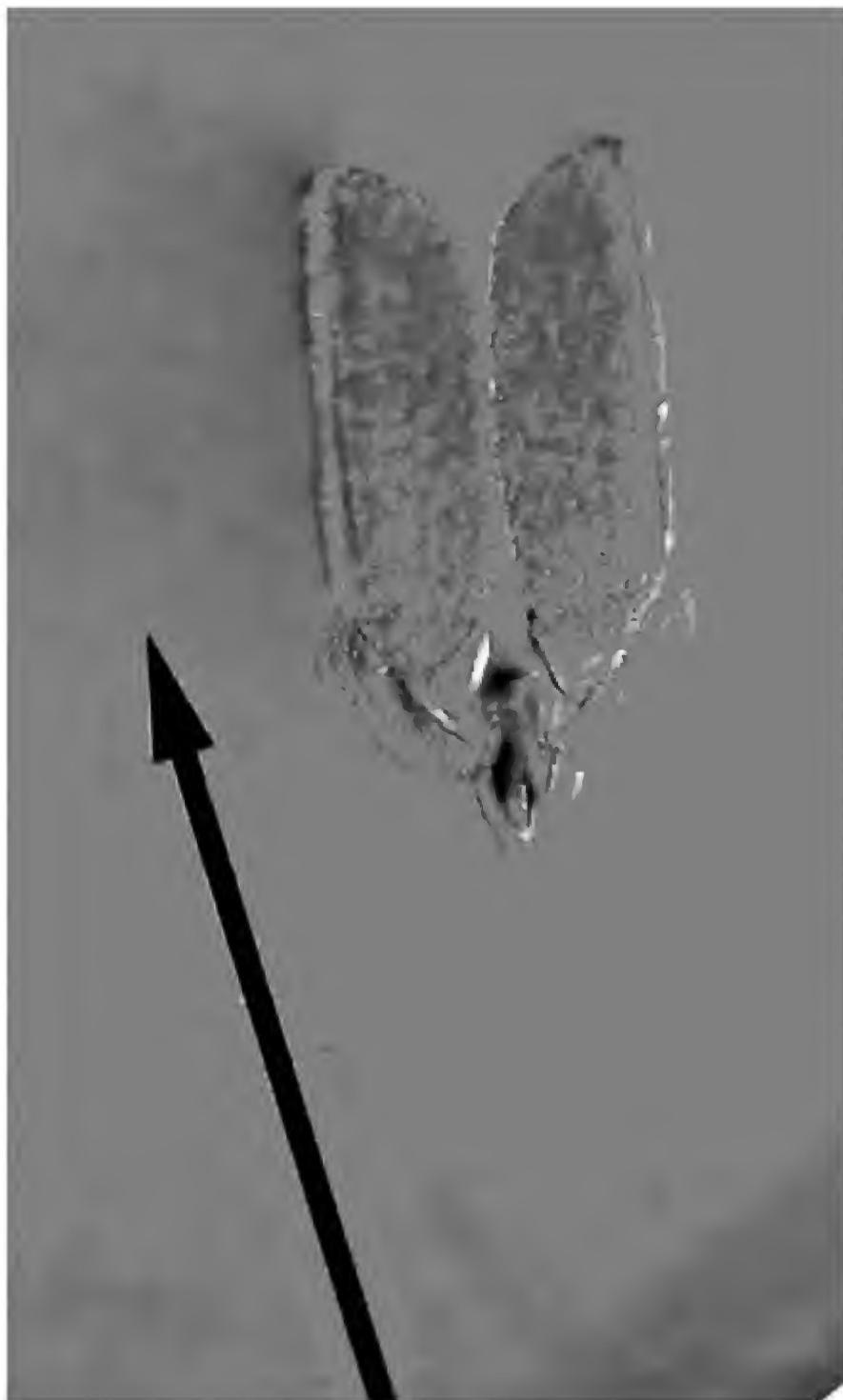
diam.: 0.13-014 mm

Caudicle bulb Type: G

Translator/caudicle type: fb/cw

Pollinia apex type: F

Retinacula character: BH



Pollinarium
enlarged 180x

Pollinium:
length 0.45 mm
widest 0.14 mm

Retinaculum:
length 0.08 mm
shoulder 0.05 mm
waist 0.03 mm
hip 0.05 mm
ext. 0.03 mm

Translator:
length 0.19 mm
wide 0.06 mm

Caudicle:
bulb diam. 0.07 mm
G

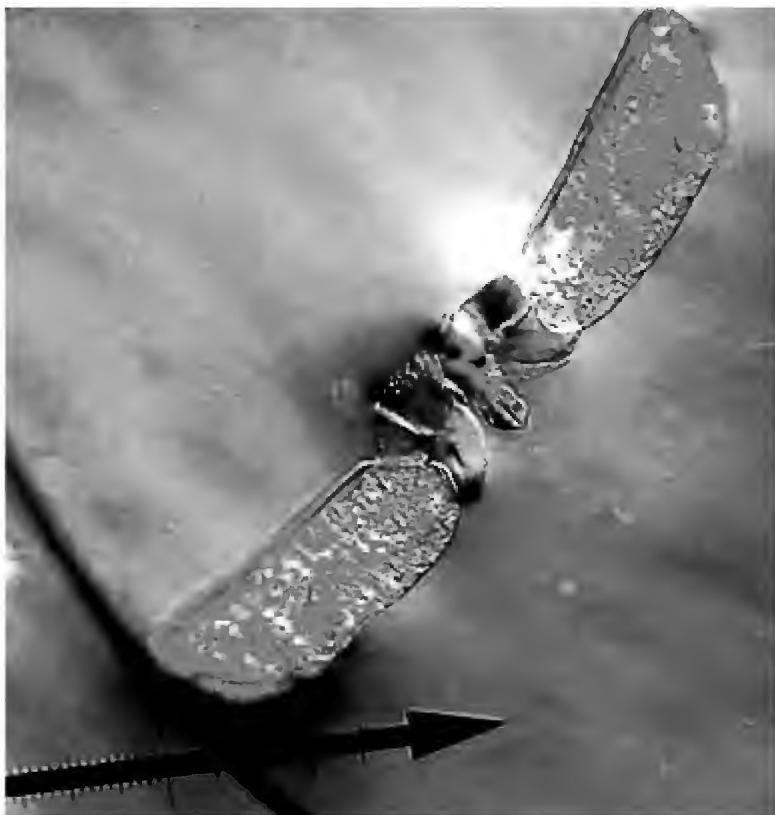
Retinacula: R

Hoya rosarioae Kloppenburg & Siar 2915

sp. CAHUP 5268

as *Hoya obscura* Burton. Photos 14 November 2006

Determination: Labeling is incorrect.



Pollinarium greatly enlarged, spread out as it was difficult to get it to lay properly.

Pollinium

length	0.45 mm
widest	0.14 mm

Retinaculum

length	0.10 mm
shoulder	0.05 mm
waist	0.03 mm
hip	0.05 mm
ext.	0.03 mm

Translators

length	0.17 mm
depth	0.05 mm

Caudicle

bulb diam. 0.07 mm

Translator caudicle type: fb/cw

Pollinia inner end type: T

Caudicle bulb: C ?

Retinacula character: R

Hoya sp. NS-0009

Collected by Nathalie Evelinsdotter on Mindoro, Philippines
Photographed 23 Feb. 2005



Pollinium

length	0.45 mm
widesrt	0.10 mm

Retinaculum

length	0.19 mm
Widest ca.	0.05 mm

Translators

length	0.15 mm
depth	0.01 mm

Caudicale

bulb end diam. 0.08 mm

Remember the translators and the caudicle both are attached to a inner wall of the retinaculum and enter through a side channel. The retinaculum here may be twisted on its axis.

Translator caudicle type: l/cw

Pollinia inner end type: T

Caudicle bulb: G

Hoya micrantha Hooker f. 1883

flowered at Fresno, CA., 19 April 1990.



Pollinarium enlarged about 165x. The pollinia have a slight tendency to have the apex apiculate but not very noticeably. Again compare this pollinarium with that of *Hoya plicata* King and Gamble. Here the translators are long with rounder form at the base. The translators are large but not massive. The retinaculum is similar to the other species, but not quite as elongated.

Translator/caudicle type: fb/cw

Pollinia inner apex type: T

Caudicle bulb: C

Retinacula character: LS

Pollinia

length	0.44 mm
widest	0.14 mm

Retinaculum

length	0.09 mm
shoulder	0.08 mm
waist	0.62 mm
extensions	0.06 mm

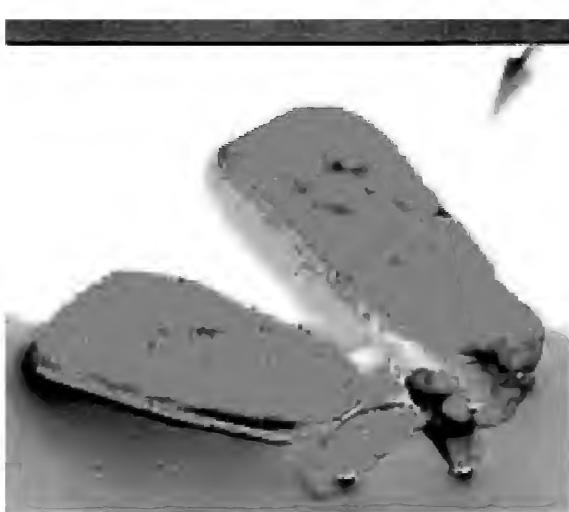
Translators

length	0.14 mm
depth	0.08 mm

Caudicle

bulb diam.	0.10 mm
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Hoya rizaliana Kloppenburg 1991



Pollinarium with measuring arrow in upper right. The pollinia are very wide and with flat truncated inner apex. The retinaculum is relatively small with the translatore large and oval shaped entering at the waste of the retinaculum. The clear caudicle bulbs are more centrally confined.

Pollinia

length	0.43 mm
widest	0.17 mm

Retinaculum

0.08 mm long

Translators

length	0.17mm
widest	0.06 mm

Caudicle bulb

0.06 mm in diam.

Translator/caudicle type: fb/cw

Pollinia inner end type: F

Caudicle bulb: C ?

Retinacula character: R

Hoya burtoniae Kloppenburg 1990

Pollinarium from clone #81084. Type clone



Magnified approximately 165x.

Pollinium

length:	0.43 mm
width:	0.15 mm

Retinaculum

length:	0.14 mm
shoulder:	0.07 mm
waist:	0.05 mm
hips:	0.04 mm

Translators

length:	0.19 mm
depth:	0.09 mm

Caudicle

bulb diam.: 0.08 mm

Type: Granulate

Translator/caudicle type: fb/cw

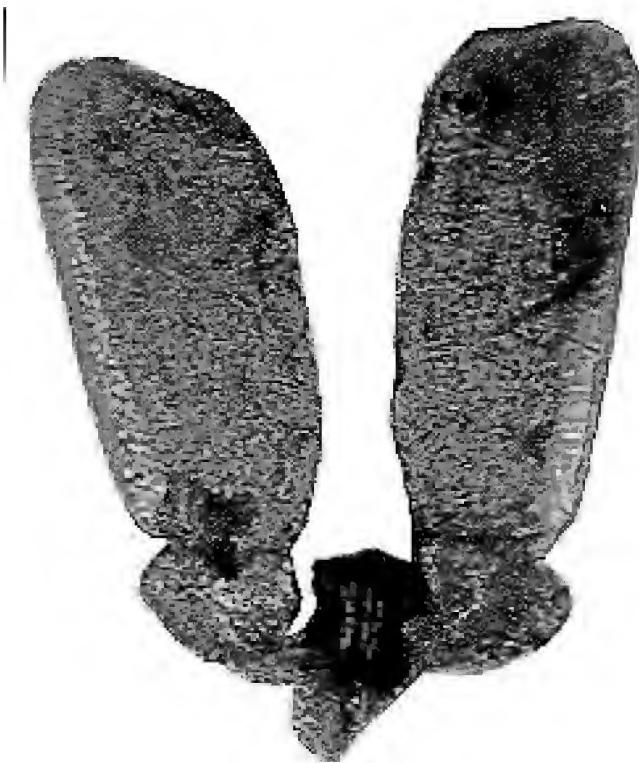
Pollinia inner end type: T

Caudicle bulb: G

Retinacula character: LS

***Hoya rhodostella* Ridley 1923**

Flower from **Type** material.



Pollinaria enlarged about 165x. On most old pressed flowers this structure is well preserved and here I was able to get several good photos of the structure.

Pollinia

length	0.43 mm
widest	0.18 mm

Retinaculum

length	0.12 mm
shoulders	0.09 mm
waist	0.07 mm
hip	0.08 mm
extensions	0.04 mm

Translators

length	0.15 mm
depth	0.05 mm

Caudicle

bulb diam.	0.11 mm
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Type: G

Translator/caudicle type: fb/cw

Pollinia inner end type: RT

Retinacula character: S

Hoya imbricata subsp. mottled leaf from Palawan 93961



Pollinarium enlarged about 165X.

Pollinia

length	0.43 mm
widest	0.16 mm

Retinaculum

length	0.13 mm
shoulder	0.07 mm
waist	0.05 mm
hip	0.07 mm
ext.	0.03 mm

Translator

length	0.22 mm
depth	variable

Caudicle

bulb diam.	0.07 mm
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Translator/ caudicle type: fb/o

There is in the Central Sulawesi area, observed and collected in 1994 a species with similar measurements and characteristics which David Kleijn and Donkelaar have placed as the above species. Their article was published in Blumea in 2001. This is probably correct but I reserve comment on the rest of their assertions regarding this species and past works:

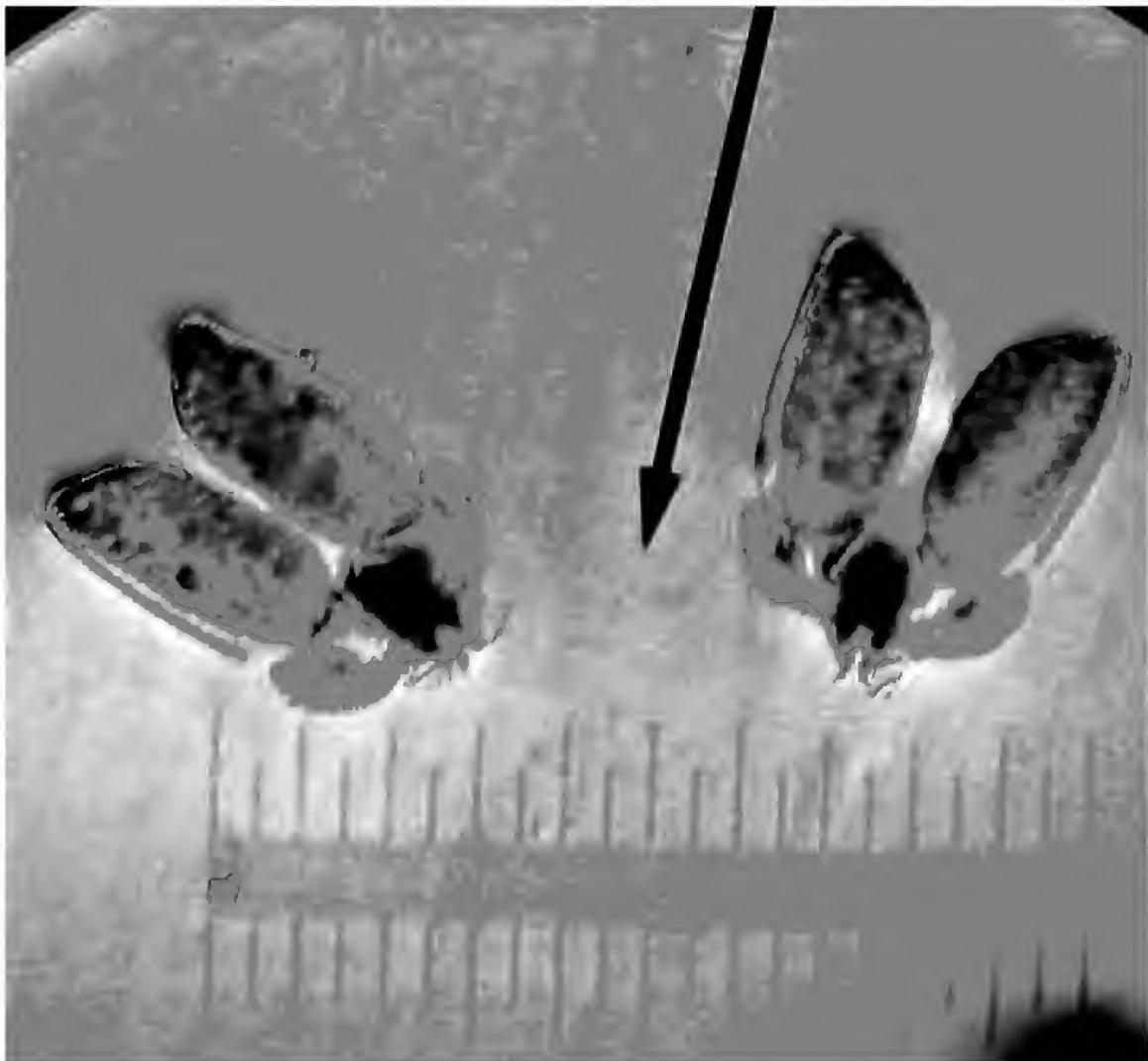
***Hoya anncajanoae* subsp. *lagyoensis* Kloppenburg & Mendoza
(unpublished) GM #126**



Pollinarium
enlarged ca. 150x.

Pollinium		Translator	
length	0.42 mm	length	0.22 mm
widest	0.19 mm	widest	0.10 mm
Retinaculum		Caudicle	
length	0.15 mm	bulb top	0.09 mm
shoulder	0.09 mm	bulb length	0.10 mm
waist	0.06 mm	0.04 mm	
hip	0.09 mm	Translator/caudicle type: fb/cw	
ext.	0.03 mm	Pollinia apex type: RT	
Caudicle type: G		Retinacula character: LS	

***Hoya kanlaonensis* Kloppenburg, Siar & Ferreras 2010 Type clone**



Pollinaria enlarged ca. 180x.

Pollinium

length	0.42 mm
widest	0.20 mm

Caudicle

bulb diam. 0.10 mm

Type: G

Retinaculum

length	0.15 mm
shoulder	0.10 mm
waist	0.09 mm
hip	0.10 mm
ext	0.06 mm

Translator

length	0.20 mm
depth	0.03 mm

Retinacula character: S ?

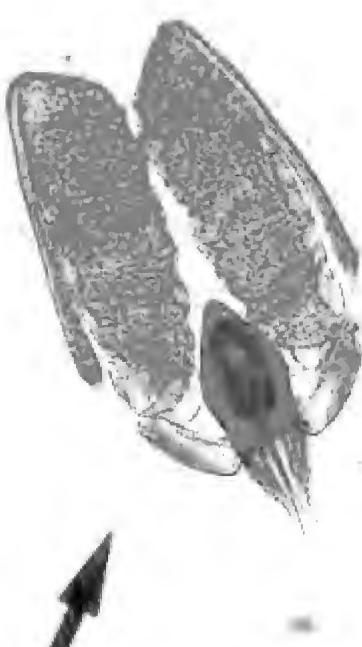
Translator/caudicle type: fb/cw

Pollinia apex type: T

Caudicle bulb: G

Hoya myrmecopa Kleijn and Donkelaar 1999

Flower grown by Ted Green **Type** clone.



Pollinarium enlarged about 165x.

Pollinium

length	0.42 mm
widest	0.16 mm

Retinaculum

length	0.17 mm
shoulders	0.10 mm
waist	0.07 mm
hip.	0.08 mm
extensions	0.10 mm

Translators

length	0.12 mm
widest	0.04 mm
depth	0.01 mm

Caudicle

bulb diam.	0.06 mm
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Translator/caudicle type: fb/cw

Pollinia apex type: F

Caudicle bulb: C

Retinacula character: HL

Hoya sp. NS00-004

Via Torill Nyhuus march 2007. Data 5/14/07, 18 flowers in cluster pedicels various lengths curved Section Acanthostemma.

Pollinarium enlarged about 55x Caudicles are cup shaped.



Pollinium

length	0.42 mm
widest	0.16 mm

Retinaculum

length	0.10 mm
shoulder	0.06 mm
waist	0.05 mm
hip	0.06 mm
ext	0.03 mm

Translator

length	0.16 mm
widest	0.04 mm

Caudicle

bulb diam.	0.07 mm top
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Translator/caudicle type: fb/cw

Pollinia inner apex type: T

Caudicle bulb: C

Retinacula character: S

***Hoya obscura* Elmer ex Burton 1986**

Flower from clone via Peter Tsang 1979,
flowered in Fresno, CA.



The distinctive Pollinium with long translator arms, and clear bulbous caudicles into which the lower end of the pollinia are pressed.
Magnified ca. 165x.

Pollinium

length	0.41 mm
widest	0.14 mm

Retinaculum

length	0.13 mm
shoulder	0.06 mm
waist	0.03 mm
hip	0.06 mm
ext.	0.02 mm

Translators

length	0.16 mm
depth	0.03 mm

Caudicle

bulb diam. 0.06 mm

Type: clear

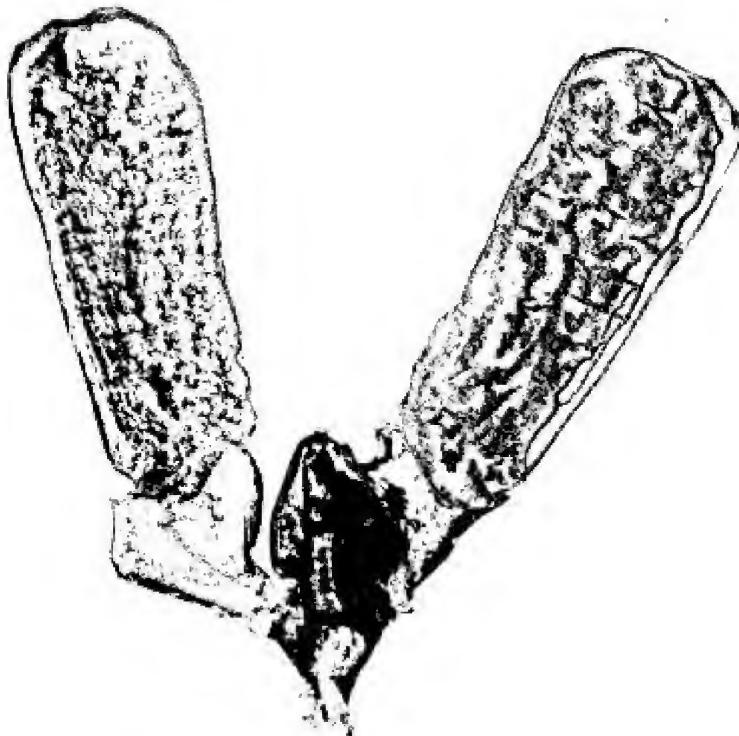
Translator/caudicle type: fb/o

Pollinia end type: F

Caudicle bulb: C

Retinacula character: LS

Hoya sp. Edano/Gutierrez (PNH) 37800 1957
Irosin, Sorsegon, Luzon Philippines.



Magnified
approximately 165x.

Pollinium

length	0.41 mm
widest	0.16 mm

Retinaculum

length	0.16 mm
shoulder	0.12 mm
waist	0.08 mm
hip	0.10 mm
ext.	0.08 mm

Translators

length	0.18 mm
depth	0.04-0.08 mm, broad outer end.

Caudicle

bulb diam.	0.10 mm
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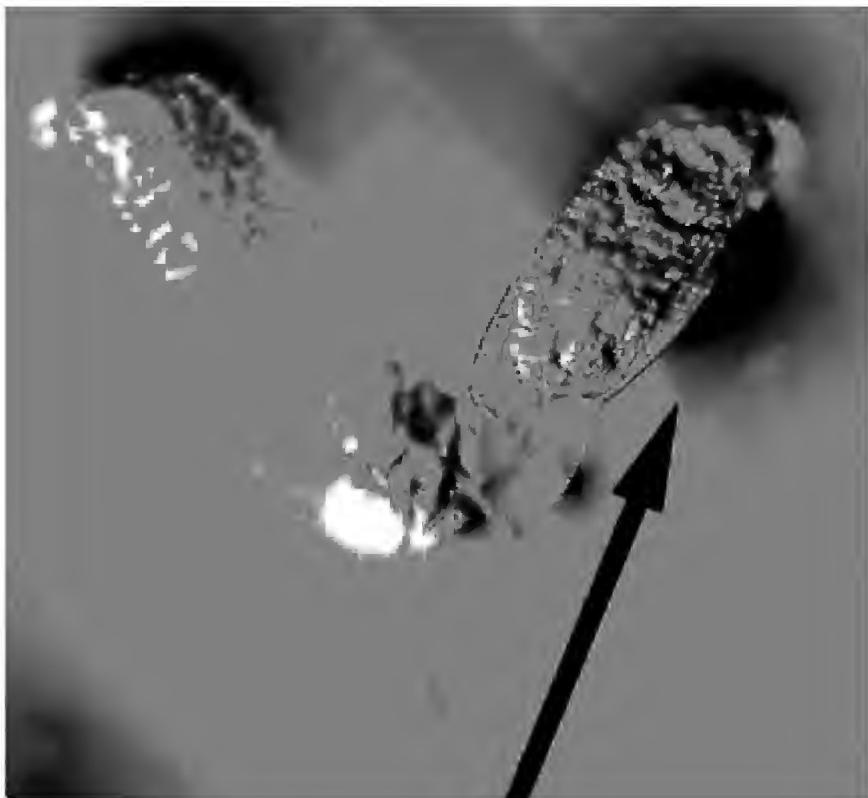
Translator/caudicle type: fb/o

Pollinia end type: R ?

Caudicle bulb: C

Retinacula character: S ?

Hoya affina Kloppenburg & Mendoza
(unpublished) GM #80



Pollinarium
enlarged ca. 130x.

Pollinium
length 0.40 mm
widest 0.15 mm

Retinaculum
length 0.10 mm
shoulder 0.06 mm
waist 0.03 mm
hip 0.07 mm
ext. 0.05 mm

Translator
length 0.15 mm
end 0.10 mm
base 0.08 mm

Caudicle
cw 0.10 x 0.10 mm

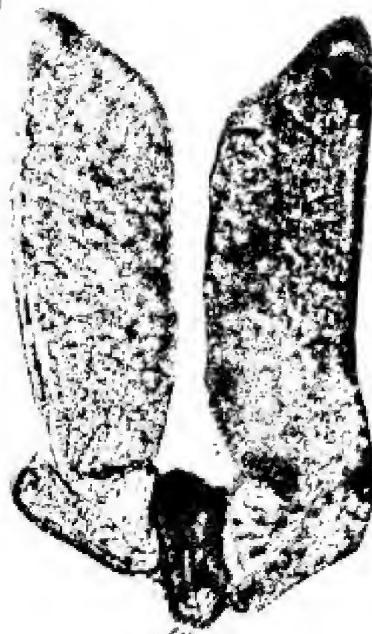
Translator/caudicle type: fb/cw

Pollinia inner end type: T

Caudicle bulb: C

Retinacula character: S

Hoya sp. PNH 4936 Gaerlan & Fuentes
Panay, Antique Prov., Mt. Midia-as, Culasi Hargod, Tubid
Philippines.



Magnified approximately 165x.

Pollinium

length:	0.40 mm
widest:	0.14 mm

Retinaculum

length:	0.11 mm
shoulder:	0.07 mm
waist:	0.05 mm
hip:	0.06 mm
ext.:	0.04 mm

Translators

length:	0.02 mm
depth:	0.04 mm

Caudicle

bulb. diam.:	0.07 mm
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Translator/caudicle type: fb/cw

Pollinia inner end type: F

Caudicle bulb: G

Retinacula character: S

Hoya scorTechinii King & Gamble 1908

Pollinarium from flower sent via Ted Green.



This is a photo of the retinaculum enlarged about 165x. The pellucid edge on the pollinia is straight, loops over the top and seems to end about 3/4 the way down the side, with a winged vacuole below. The head of the retinaculum is rounded, it is relatively large and short. The translators are narrow in side view and the clear caudicles are very visible (especially on the right side in the photo)

Pollinium

length	0.40 mm
widest	0.21 mm

Retinaculum

length	0.23 mm
shoulder	0.13 mm
waist	0.10 mm
hip	0.13 mm
extensions	0.06 mm

Translators

length	0.30 mm
depth	0.80 mm

Caudicles

diameter	0.05 mm
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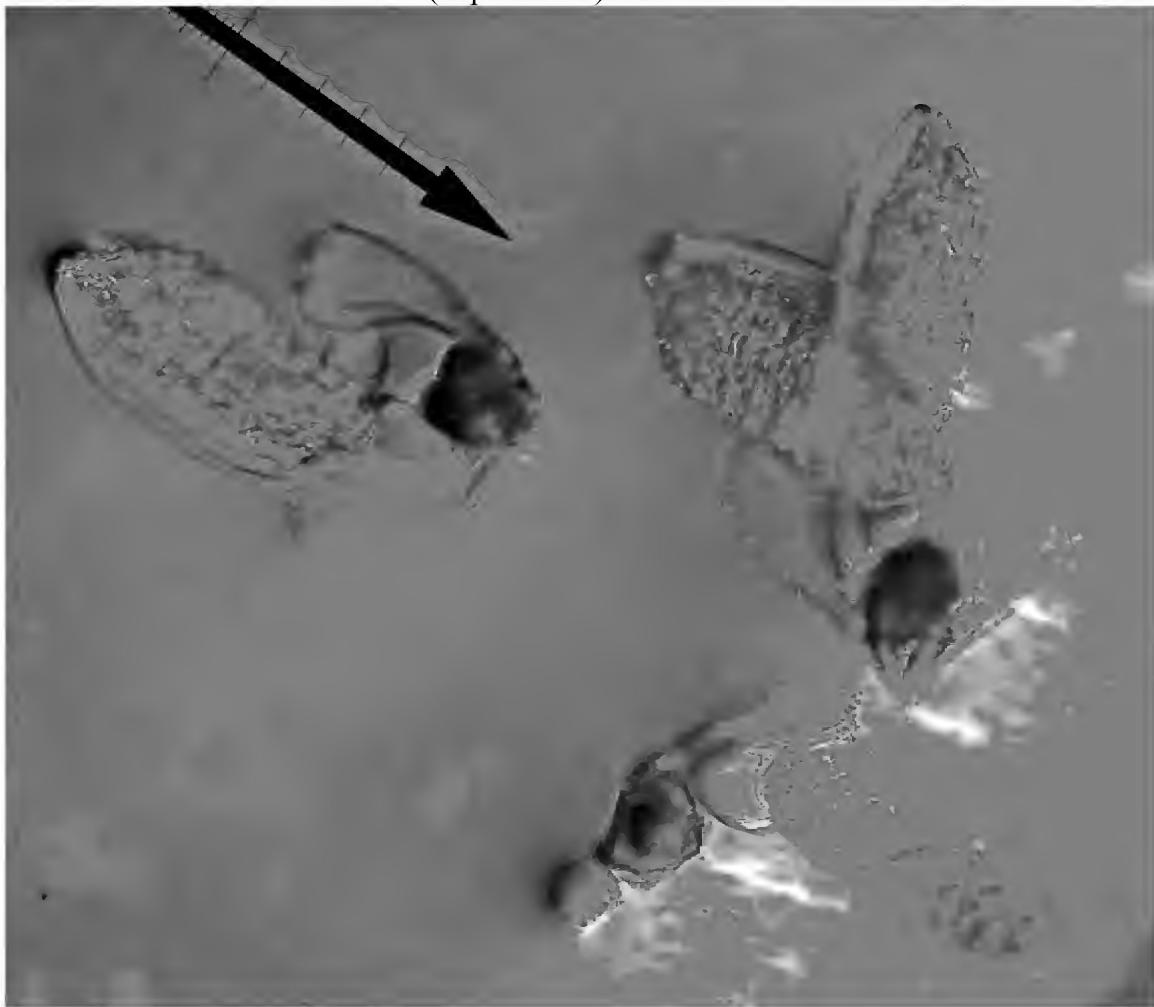
Translator/caudicle type: l/cw

Pollinia apex type: RT

Caudicle bulb: G

Retinacula character: LN

***Hoya wayetii* subsp. *lagyoensis* Kloppenburg & Mendoza
(unpublished) GM #125**



Pollinaria enlarged slightly over 120x.

Pollinium

length	0.39 mm
Widest	0.17 mm

Retinaculum

length	0.10 mm
shoulder	0.10 mm
waist	0.09 mm
hip	0.10 mm
ext.	0.06 mm

Caudicle

bulb diam. 0.10 mm

Translator/caudicle type: fb/cw

Pollinia apex type: F

Translator

length	0.25 mm
widest	0.10 mm

Caudicle bulb: G

Retinacula character: R

***Hoya litoralis* Schlechter 1905**
TG as IML 708



Pollinarium enlarged about 165x.

Pollinia

length	0.39 mm
widest	0.15 mm

Retinaculum

length	0.15 mm
shoulder	0.06 mm
waist	0.04 mm
hip	0.06 mm
ext.	0.05 mm

Translator

length	0.14 mm
depth	0.05 mm
width	0.03 mm

Caudicle

bulb diam.	0.10 mm
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Schlechter said retinacula is minute (not here)
also translators very small wedge shaped.

Translator/caudicle type: fb/o

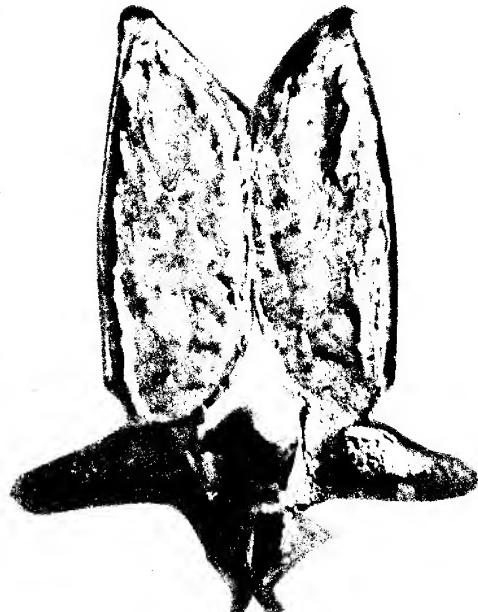
Pollinia inner apex type: F

Caudicle bulb: G

Retinacula character: HS

***Hoya nummularioides* Constantin 1912**

Flowers from “red” & “pink” (inner coronal colored) clones, Thailand.



Red clone magnified approximately 165x.

	<u>red clone</u>	<u>pink clone</u>
Pollinium		
length:	0.38 mm	0.34 mm
widest:	0.12 mm	0.12 mm
Retinaculum		
length:	0.14 mm	0.15 mm
shoulder:	0.08 mm	0.09 mm
waist:	0.05 mm	0.06 mm
hip:	0.07 mm	0.08 mm
ext.:	0.05 mm	0.05 mm
Translators		
length:	0.16 mm	0.01 mm
depth:	0.02 mm	0.02 mm
Caudicle		
bulb diam.:	0.07 mm	0.05 mm



Pink clone magnified approximately 165x.

Comments: I assume these are from the same species, since the major features are very similar. The translators are a little shorter on the Pink clone and there are other minor (hundredths of a millimeter) differences. Overall the plant, foliage and growth habits are very similar.

Translator/caudicle type: fb/cw

Pollinia inner apex type: F

Caudicle bulb: ?

Retinacula character: R

***Hoya panayensis* Kloppenburg & Siar 2009**



Pollinarium enlarged
about 85x.

Pollinium

length	0.37 mm
widest	0.14 mm

Ratio: pol./width 2.6
 pol./ret. 2.6

Retinaculum

length	0.13 mm
shoulder	0.07 mm
waist	0.03 mm
hip	0.04 mm
ext.	0.01 mm

Translator/caudicle type: fb/cw

Translator

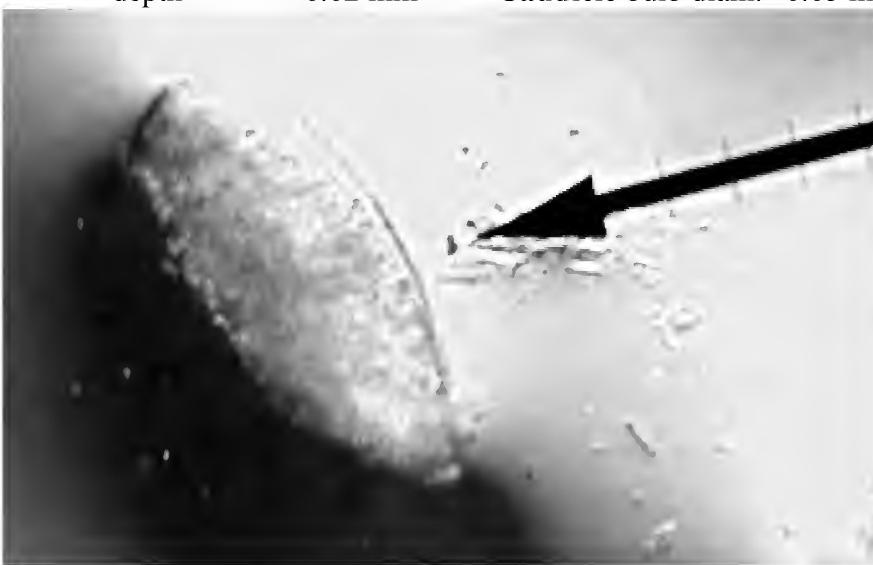
length	0.11 mm
depth	0.02 mm

Pollinia inner apex type: F

Caudicle bulb: G

Caudicle bulb diam. 0.05 mm

Pollinium enlarged
as above .



Foliage glabrous,
elliptic-lanceolate,
apex acute, nerves
pinnate, base sub-
obtuse to ovate. 3.6
– 7.6 cm long x 1.5
- 2.7 cm at the
widest.

***Hoya lacunosa* Blume 1826**
Flower from blooming at Fresno, CA., USA.



The pollinium magnified approximately 165 times. Note the darkened translator arms are attached well down on the retinaculum below the waste area and are rounded at the outer extremity. The caudicles are very inflated and seem to attach well down on the long waste of the retinaculum. The pollinia have a well defined pellucid edge that extends all the way to the apex. The outer apex tapers inward. The Pollinia of hoyo species are each individualistic and distinctive.

Pollinium

length	0.37 mm
widest	0.14 mm

Retinaculum

length	0.10 mm
shoulder	0.06 mm
waist	0.03 mm
hip	0.05 mm
extensions	0.02 mm

Translators

length	0.17 mm
depth	0.05 mm

Translator/caudicle type: fb/cw

Pollinia inner apex: F

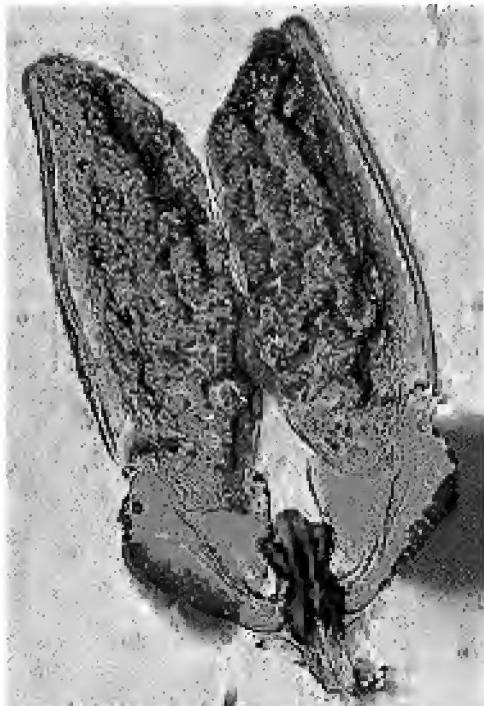
Caudicle bulb: C

Retinacula character: R

Caudicle

bulb diam.	0.04 mm
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Hoya brevialata Kleijn & Donkelaar 2001 Type clone
Pollinarium from Flower of Sulawesi, Indonesia, 1994.



Pollinarium enlarged about 165x. This is a very distinctive structure.

Pollinia

length	0.37 mm
widest	0.14 mm

Retinaculum

length	0.11 mm
shoulder	0.06 mm
waist	0.03 mm
hip	0.05 mm
extensions	0.06 mm

Translators

length	0.19 mm
widest	0.02 mm ca.
depth	0.04 mm

Caudicles

bulb	0.09 mm
length	0.14 mm

Translator/caudicle type: fb/cw

Pollinia inner apex type: FT

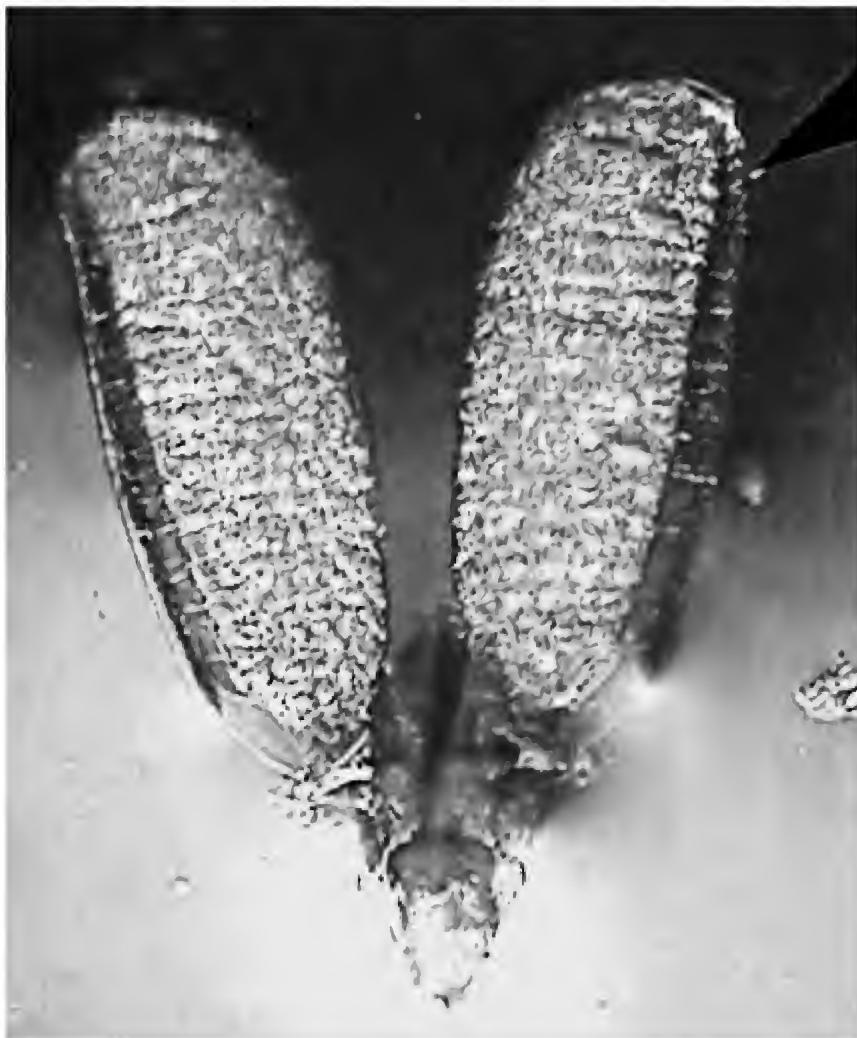
Caudicle bulb: G

Retinacula character: S

This species was previously thought to be *Hoya incurvula* Schlechter.

Hoya santafeensis Kloppenburg & Mendoza 2015
GM #179

Pollinaria enlarged 200x.



Pollinium

length
0.37 mm
widest
0.15 mm

Retinaculum

Caudicle

length	0.10 mm	bulb	0.08 cm x 0.10 mm
shoulder	0.06 mm		
waist	0.04 mm		
hip	0.07 mm		
ext.	0.05 mm		

Translator

length
0.18 mm
widest
0.05 mm

Translator/caudicle type: fb/cw

Pollinia apex type: F

Caudicle bulb: C

Retinacula character: 2S

Hoya rima Kloppenburg, Mendoza & Ferreras 2014
GM #72



Pollinarium enlarged ca.
170x.

Pollinia:

length	0.37 mm
widest	0.14 mm

Retinaculum:

length	0.08 mm
shoulder	0.07 mm
waist	0.04 mm
hip	0.06 mm
extensions	0.06 mm

Translator:

length	0.14 mm
widest	0.04 mm

Caudicle:

bulb diam. 0.06 mm

Translator/caudicle Type:
fb/cw

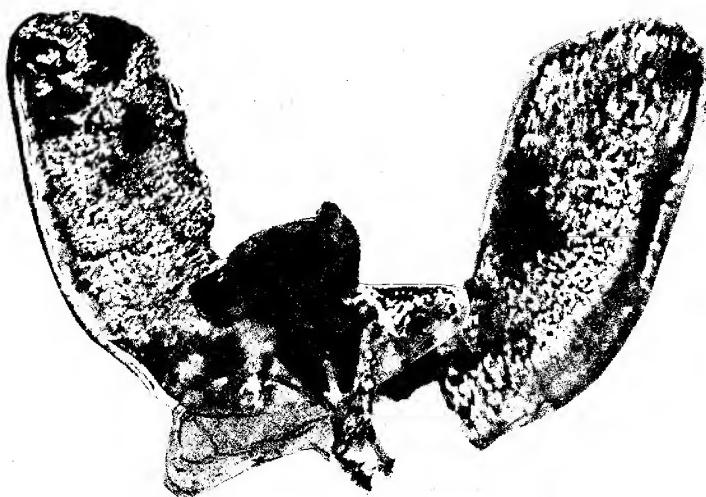
Pollinia apex type: T

Caudicle bulb: C

Retinacula character: S

Hoya sp. UC 424
Zamboanga, Philippines.

Magnified approximately 165x



Pollinium

length: 0.36 mm
widest: 0.15 mm

Retinaculum

length: 0.12 mm
shoulder: 0.15 mm
waist: 0.05 mm
hip: 0.08 mm
ext.: 0.03 mm

Translators

length: 0.15 mm
depth: 0.02 mm

Caudicle

bulb. diam.: ?

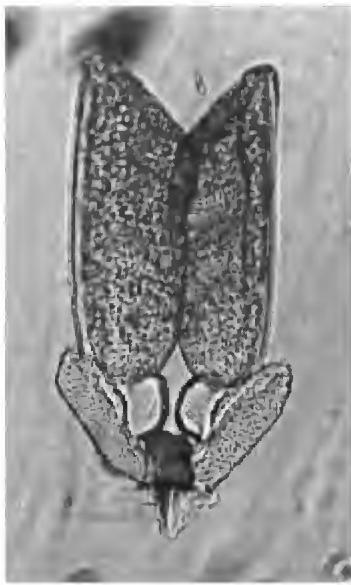
Translator/caudicle type: fb/cw

Pollinia apex type: T

Caudicle bulb: ?

Retinacula character: HU

***Hoya sипitangensis* Kloppenburg & Wiberg 2002 Type clone**



Pollinarium enlarged about 165x.

Pollinia

length	0.36 mm
widest	0.09 mm

Retinaculum

length	0.06 mm without extensions
head	domed
shoulders	0.04 mm
waist	0.05 mm
hips	0.02 mm
extensions	0.04 mm

Translator

length	0.13 mm.
depth	0.03 mm
width	0.01 mm ca.

Caudicle

bulb diameter 0.04 mm ca.
Type: C



Another view of the pollinarium same enlargement as above but focused on the retinaculum to show it more distinctly.

Translator/caudicle type: fb/cw

Pollinia apex type: F

Caudicle bulb: C

Retinacula character: S

***Hoya burtoniae* Kloppenburg 1990**



Pollinaria enlarged about 165x. There is a fairly wide vacuole all away along the pellucid edge of the pollinia. The translatore are well developed drumstick shaped, supporting the clear pollywog shaped caudicles. The retinaculum has a high shoulder and a knob below this just above the hip area.

Pollinia

length	0.36 mm
widest	0.14 mm

Retinacula

length	0.07 mm
shoulder	0.05 mm
waist	0.04 mm
hip	0.05 mm
extensions	0.03 mm or more

Translators

length	0.13 mm
widest	0.06 mm

Caudicle bulb diameter 0.05 mm

Translator/caudicle type: fb/o

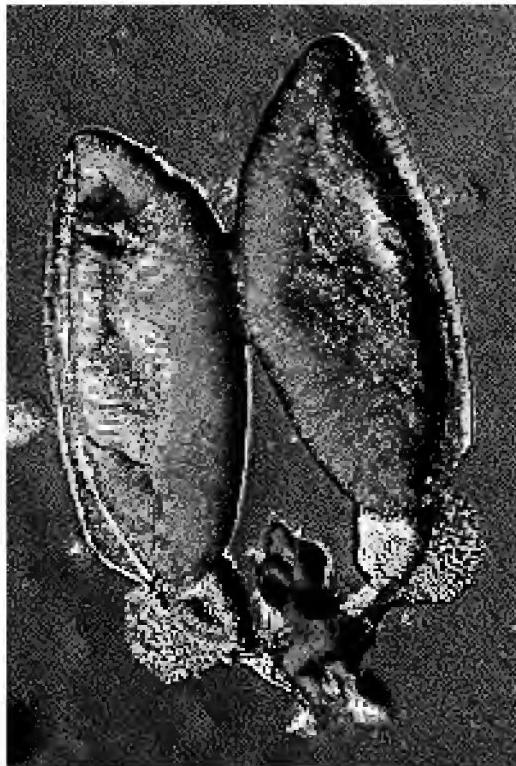
Pollinia inner end type: T

Retinacula: HU

Caudicle: C

Hoya poolei White & Francis 1928

Flowered and grown in Fresno, CA. USA.



Here is a really distinctive pollinarium enlarged about 165x. Again in some ways it is similar to the one of *Hoya eitapensis* Schlechter in the structure of the translator arms but here the caudicle is also structured (fine circular pebbling of the surface, not clear). The pollinia are shaped like large cleavers with unusual apices. The retinacula is also unusual with a distinct head area, a narrow waist and very wide hips with short extensions.

Pollinium

length	0.36 mm
widest	0.14 mm

Retinaculum

length	0.13 mm
shoulder	0.06 mm
waist	0.04 mm
hip	0.08 mm
extensions	0.04 mm

Translators

length	0.14 mm
depth	0.06 mm

Translator/caudicle type: fb/cw

Retinacula character: S

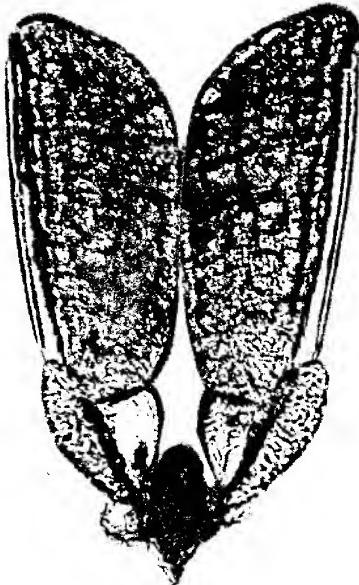
Caudicle

bulb. diam.	0.09 mm
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Pollinia apex type: T

Caudicle bulb: G

***Hoya lacunosa* Blume 1826**
Pollinarium from flower of clone labeled var. pallida.



Pollinarium Magnified
approximately 165x

Pollinia

length: 0.36 mm
widest: 0.14 mm

Retinaculum

length: 0.09 mm
shoulder: ca. 0.05 mm
waist: ca. 0.04 mm
ext.: 0.03 mm

Translators

length: 0.16 mm
depth: 0.03 mm

Caudicle

bulb diam.: 0.05 mm

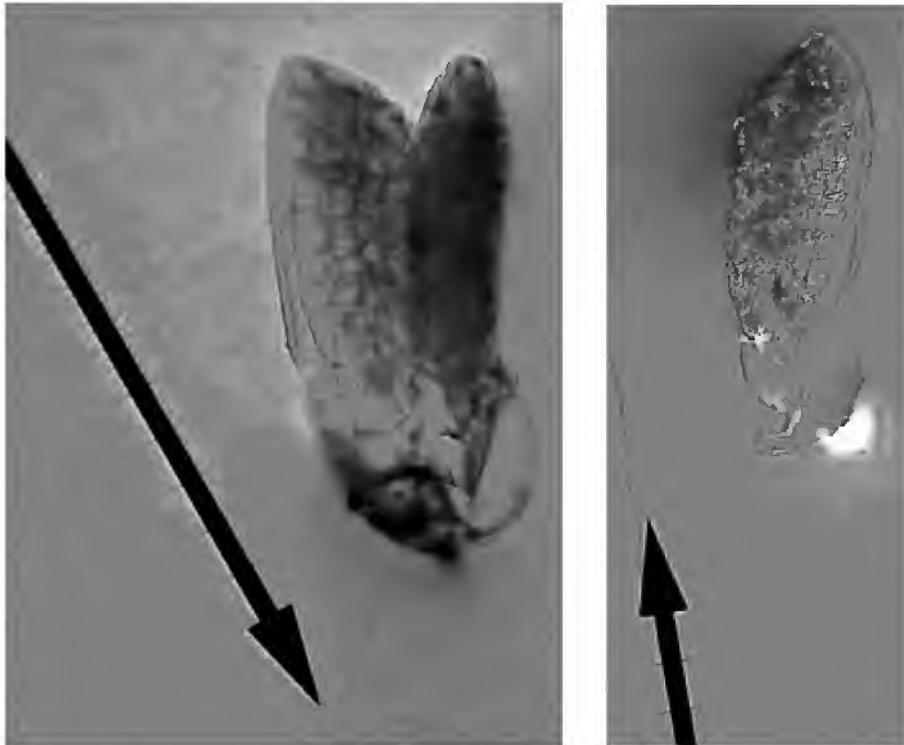
Translator/caudicle type: fb/cw

Pollinia apex type: T

Caudicle bulb: G

Retinacula character: R

***Hoya geotropa* Kloppenburg & Mendoza**
(unpublished) GM #141



Pollinarium
enlarged ca.
120x

Measurements
from the 3
photos of this
structure.

Pollinium

length	0.36 mm
widest	0.13 mm

Translator

length	0.09 mm
widest	0.05 mm

Retinaculum

length	0.20 mm
shoulder	0.07 mm
waist	0.05 mm
hip	0.07 mm
ext	0.05 mm

Caudicle

bulb diam.	0.05 mm
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Translator/caudicle Type: fb/cw

Pollinia apex type: TR

Caudicle bulb: C



Pollinium enlarged ca. 160x.

Pollinium

length	0.31 mm
widest	0.13 mm

Retinaculum

length	0.06 mm
shoulder	0.06 mm
waist	0.04 mm
hip	0.06 mm
ext.	0.04 mm

Translator

length	0.13 mm
depth	0.03 mm

Caudicle

Type:	G
top cup	0.07 mm
length	0.07 mm

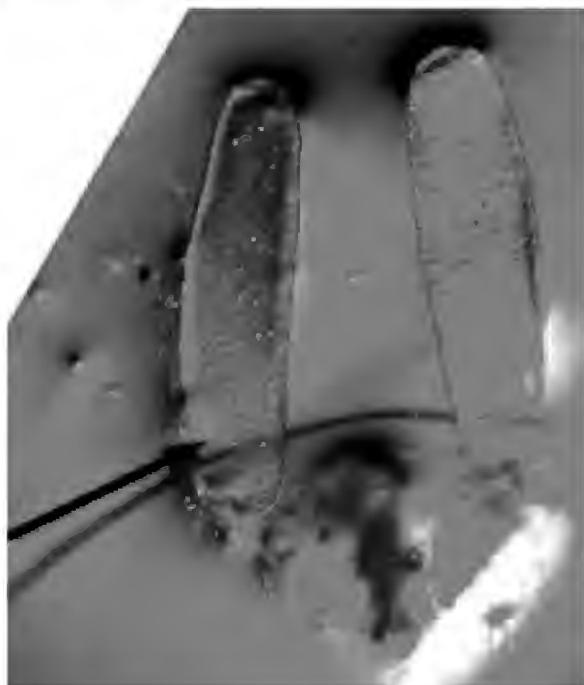
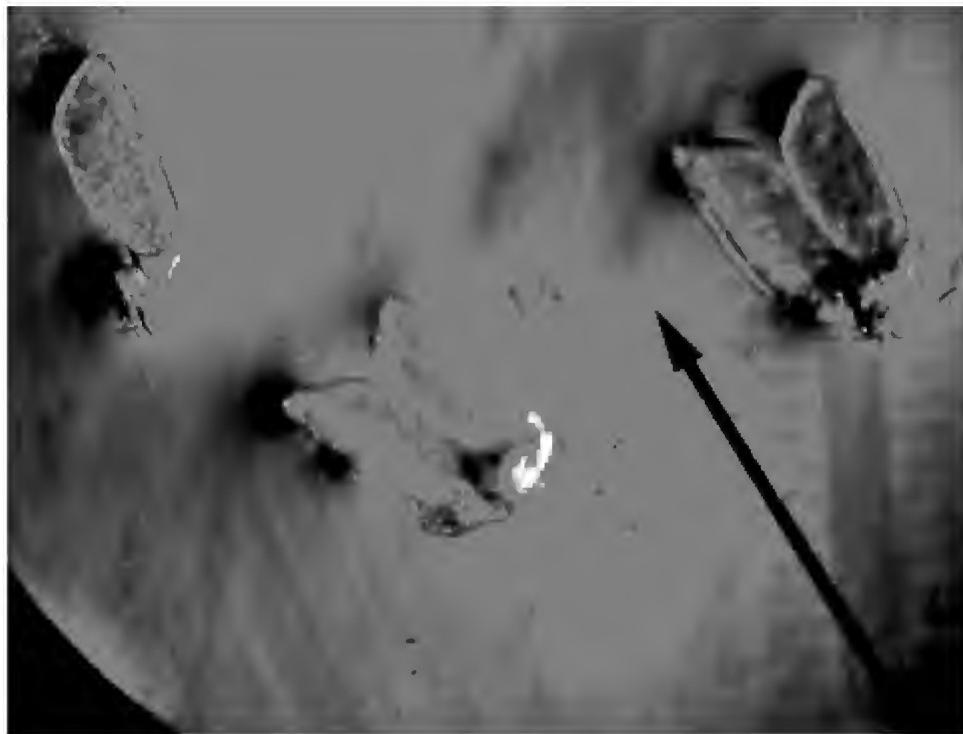
Translator/caudicle type:

fb/cw

Pollinia: RT

Retinacula: S

***Hoya apoensis* subsp. *sagittaria* Kloppenburg, Siar & Ferreras 2010**



Pollinium

length	0.35 mm
widest	0.08 mm

Retinaculum

length	0.13 mm
shoulder	0.08 mm
waist	0.06 mm
hip	0.08 mm
ext.	0.04 mm

Translator

length	0.15 mm
depth	0.04 mm

Caudicle

bulb diam. 0.09 mm

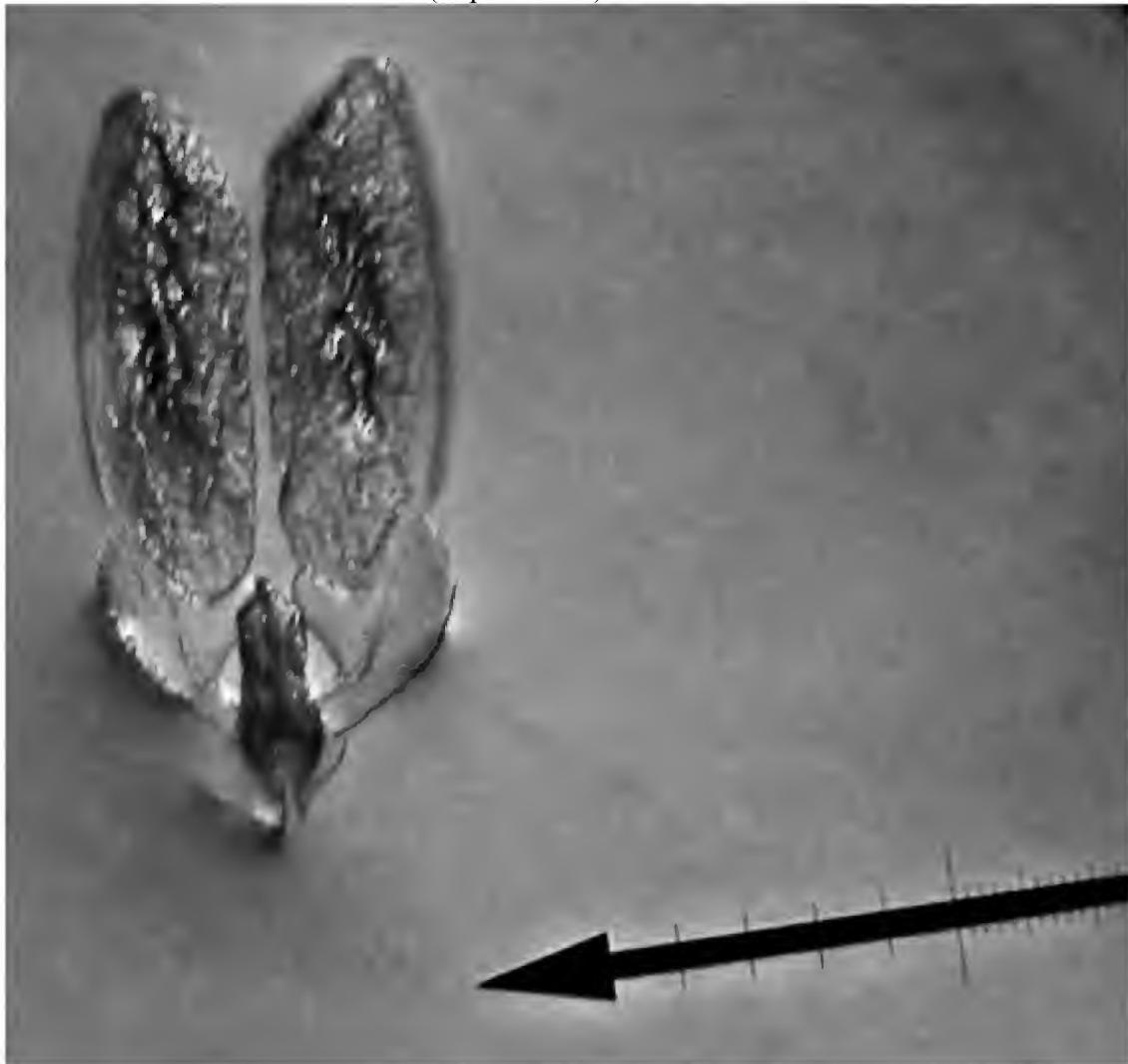
Type: G

Retinacula type: 2S

Translator/caudicle type: fb/cw

Pollinia inner apex type: R

Hoya mitisa Kloppenburg & Mendoza
(unpublished) GM #148



Pollinaria enlarged 180x.

Pollinium

length	0.35 mm
widest	0.12 mm

Retinaculum

length	0.11 mm
shoulder	0.05 mm
waist	0.04 mm
hip	0.06 mm
ext.	0.05 mm

Caudicle

bulb 0/07 mm, top x 0.08 mm, depth

Translator/caudicle type: fb/cw

Retinacula character: E

Translator

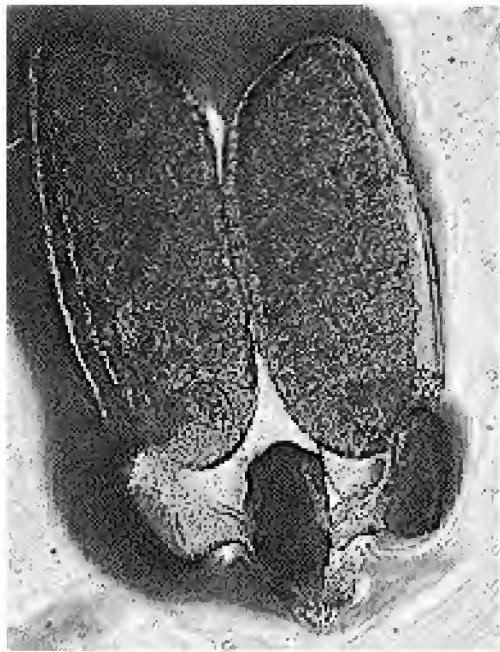
length	0.15 mm
widest	0.05 mm

Pollinia inner apex type: F

Caudicle bulb: C

Hoya eitapensis Schlechter 1909

Flowered in Fresno, CA. USA.



Pollinarium enlarged about 165x. The pollinia are oval with the apex taper inward as do nearly all pollinia in the hoya species. The pellucid edge extends from the top to near the lower apex. The dark retinaculum is relatively small, the translators long and drumstick shaped, with wide outer apices. The clear caudicles are large with bulbous ends. The extensions narrow (legs). I believe the one most distinct thing is the wideness of the pollinia and rather uniform width throughout.

Pollinia

length	0.35 mm
widest	0.15 mm

Retinaculum

length to crotch	0.10 mm
head	0.09 mm wide.
waist	0.06 mm
hips	0.08 mm
extensions	0.05 mm

Translators

length	0.10 mm
widest	0.07 mm; complex

Caudicles

bulbous end	oval,
	0.10 mm x 0.06 mm

Translator/caudicle type: fb/o

Pollinia apex type: RT

Caudicle bulb: G

Retinacula character: LS

Hoya pseudolittoralis Norman 1937

Flower from clone van Ann Wayman purchased as *Hoya gracilis* Schlechter.



Pollinarium enlarged about 165x. The pellucid edge of the pollinia are distinct looping over the outer apex with a well-developed vacuole inwardly, apex is sloping inwardly and basely rounded, supported by the clear caudicles. The translators are structured relatively deep. The retinacula is much larger here than with Schlechter's *Hoya anulata*.

Pollinia

length	0.35 mm
widest	0.14 mm

Retinaculum

length	0.12 mm overall
shoulder	0.05 mm wide
hip	0.04 mm
waist	0.05 mm
extensions	0.05 mm; thick

Translator

length	0.13 mm
depth	0.06 mm
width	ca. 0.03 mm

Caudicle

bulb diam.	0.1 mm
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Translator/caudicle type: fb/cw

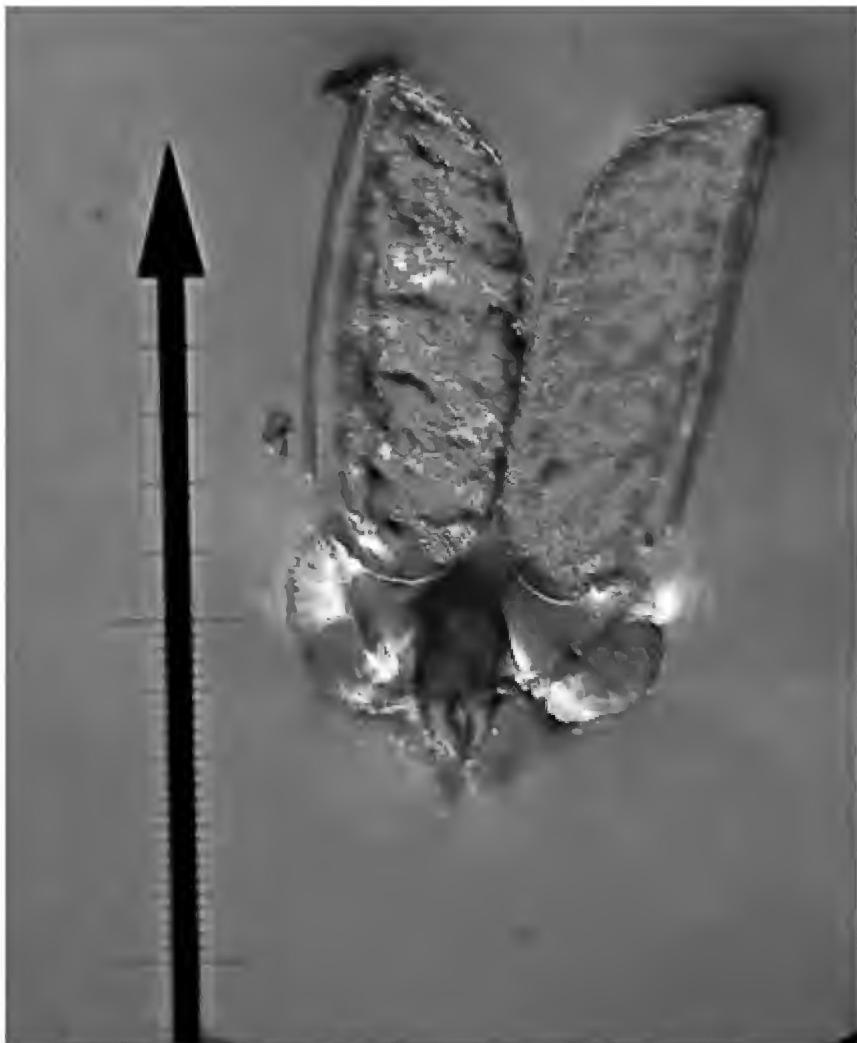
Pollinia apex type: F

Caudicle bulb: C

Retinacula character: LS

Hoya ignota Kloppenburg, Siar & Cajano

Pollinarium enlarged about 165x.



Pollinium

length 0.38 mm
widest 0.16 mm

Retinaculum

Length 0.20 mm
shoulder 0.09 mm
waist 0.06 mm
hip 0.06 mm
ext. 0.05 mm

Translator

length 0.18 mm
depth 0.06mm

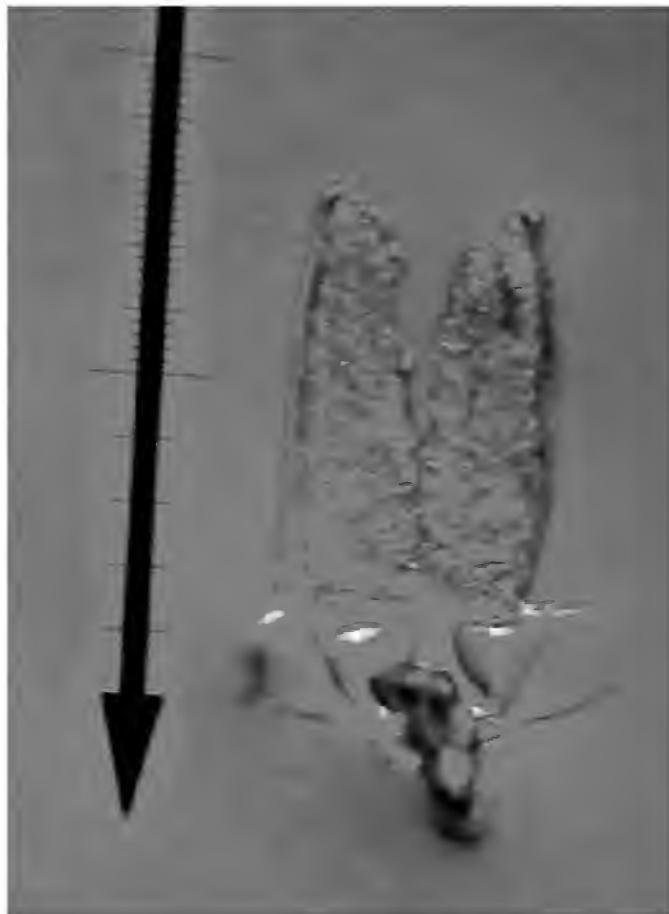
Caudicle

bulb diam. 0.11 mm

Ratios: p/r 1.9
p/w 2.4

Translator/caudicle
type: fb/cw

***Hoya pseudoleytensis* subsp. *majora* Kloppenburg & Mendoza**
(unpublished) GM #104



Pollinarium enlarged ca. 160x.

Pollinium

length	0.35 mm
widest	0.13 mm

Retinaculum

length	0.10 mm
shoulder	0.08 mm
waist	0.04 mm
hip	0.08 mm
ext.	0.03 mm

Translator

length	0.14 mm
widest	0.07 mm

Caudicle

bulb diam. 0.07 x 0.06 mm

Translator/caudicle type: fb/cw

Pollinia apex type: T

Caudicle bulb: C

Retinacula character: S ?

***Hoya davidcummingii* Kloppenburg 1995**

Type material #9 (BISH).



Pollinarium approximately 165x.

Pollinium

length:	0.35 mm
widest:	0.17 mm

Retinaculum

length:	0.30 mm
shoulder:	0.10 mm
waist:	0.09 mm
hips:	0.10 mm
ext.:	0.65 mm

Translators

length:	0.15 mm
depth:	0.09 mm
width	0.03 mm

Caudicle

diam.:	0.07 mm
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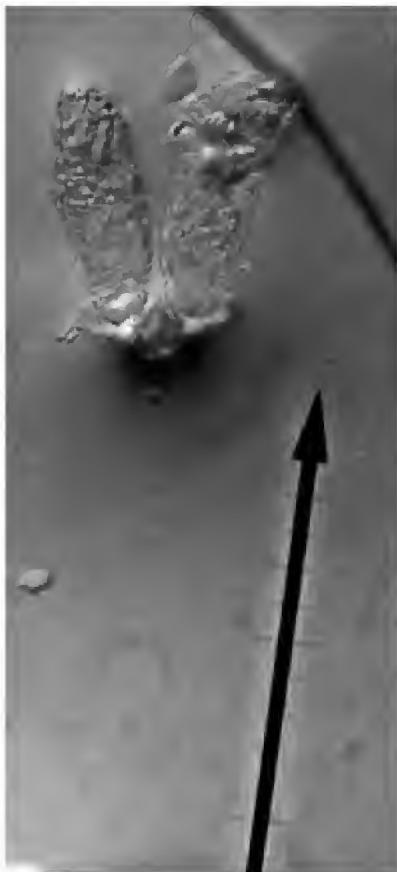
Translator/caudicle type: fb/cw

Pollinia apex type: T

Caudicle bulb: G

Retinacula character: HE

***Hoya corazoniae* Kloppenburg, Siar & Ferreras 2010**



Pollinarium enlarged ca. 80x

Pollinium

length	0.34 mm
widest	0.12 mm

Retinaculum

length	0.10 mm
widest	0.09 mm

Translator

length	0.07 mm
depth	0.02 mm

Caudicle

bulb diam.	0.06 mm
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Translator/caudicle type: fb/cw

Pollinia apex type: RT

Caudicle bulb: C

Retinacula character: HE ?

Hoya setsukokobayashiae Kloppenburg & Mendoza
(unpublished) GM #3



Pollinarium enlarged ca. 230x.

Pollinium

length	0.34 mm
widest	0.13 mm

Retinaculum

length	0.08 mm
shoulder	0.04 mm
waist	0.03 mm
hip	0.04 mm
ext.	0.03 mm

Translator

length	0.12 mm
width	0.04 mm

Caudicle

bulb diam.	0.07 mm
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Translator/caudicle type: fb/cw

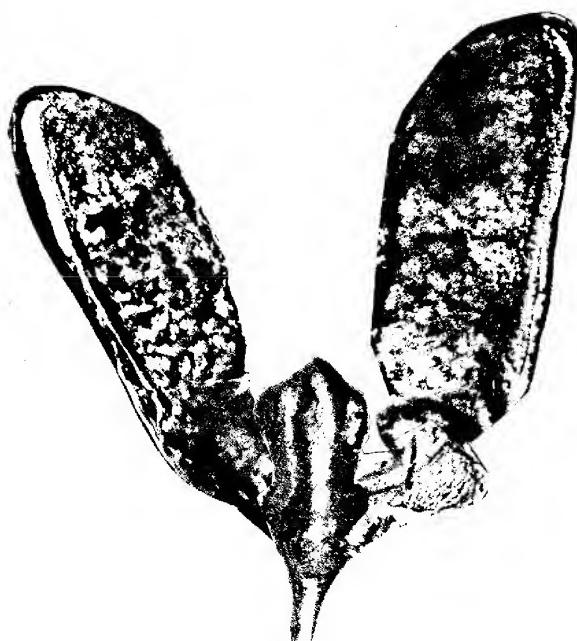
Pollinia apex type: RT

Caudicle bulb: C

Retinacula character: S ?

Ratio: p/r 4.1 p/w 2.6

Hoya tsangii Burton 1991
Pollinarium from Type Elmer #13372
collected from Cabadbaran, 1000' elevation, Mt. Bulusan
Sorlugon Prov. Luzon, Philippines (1916).



Magnified approximately
165x.

Pollinium

length:	0.34 mm
widest:	0.13 mm

Retinaculum

length:	0.18 mm
shoulder	0.10 mm
waist:	0.07 mm
hip:	0.09 mm
ext.:	0.06 mm

Translators

length:	0.13 mm
depth:	0.05 mm

Caudicle

diam.:	0.06 mm
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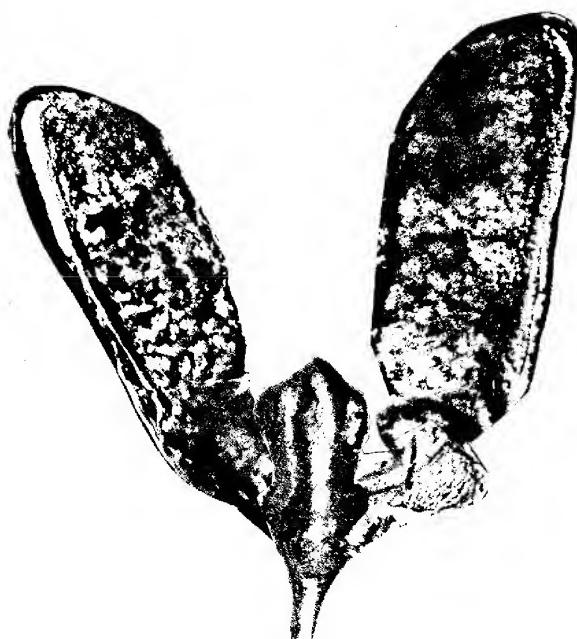
Translator/caudicle type: fb/cw

Pollinia apex type: T

Caudicle bulb: ?

Retinacula character: S

Hoya tsangii Burton 1988
Pollinarium from Type Elmer #13372
collected from Cabadbaran, 1000' elevation, Mt. Bulusan
Sorlugon Prov. Luzon, Philippines (1916).



Magnified approximately
165x.

Pollinium

length:	0.34 mm
widest:	0.13 mm

Retinaculum

length:	0.18 mm
shoulder	0.10 mm
waist:	0.07 mm
hip:	0.09 mm
ext.:	0.06 mm

Translators

length:	0.13 mm
depth:	0.05 mm

Caudicle

diam.:	0.06 mm
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Translator/caudicle type: fb/cw

Pollinia apex type: T

Caudicle bulb: ?

Retinacula character: S

Hoya krohniana Kloppenburg & Siar 2009



Pollinarium enlarged about 165x.

Pollinium

length	0.34 mm.
widest	0.13 mm.

Retinaculum

length	0.09 mm.
shoulder	0.04 mm.
waist	0.02 mm.
hips	0.03 mm.
ext.	0.02 mm.

Translator

length	0.19 mm.
widest	0.035 mm.
depth	0.01 + mm.

Caudicle bulb is elongate D shaped

length of bulb	0.10 mm.
widest	0.07 mm.

The translators are very long extending beyond the pollinia apex and the caudicle bulbs. Bulb portion of the caudicles lay on the translators are long and bulbous with long extensions entering the retinacula sides.

Translator/caudicle: lb/cw

Caudicles: C

Pollinia inner ends: T

Retinacula: E

Hoya nummularioides Costantin 1912
Pink clone

Pollinarium enlarged about 165x. This is the pink clone. See Pollinaria book for comparisons and details.



Pollinia

length	0.34 mm
widest	0.12 mm

Retinaculum

length	0.15 mm
shoulder	0.09 mm
waist	0.60 mm
hip	0.08 mm
extensions	0.05 mm

Translator

length	0.01 mm
depth	0.02 mm

Caudicle

bulb diameter 0.05 mm

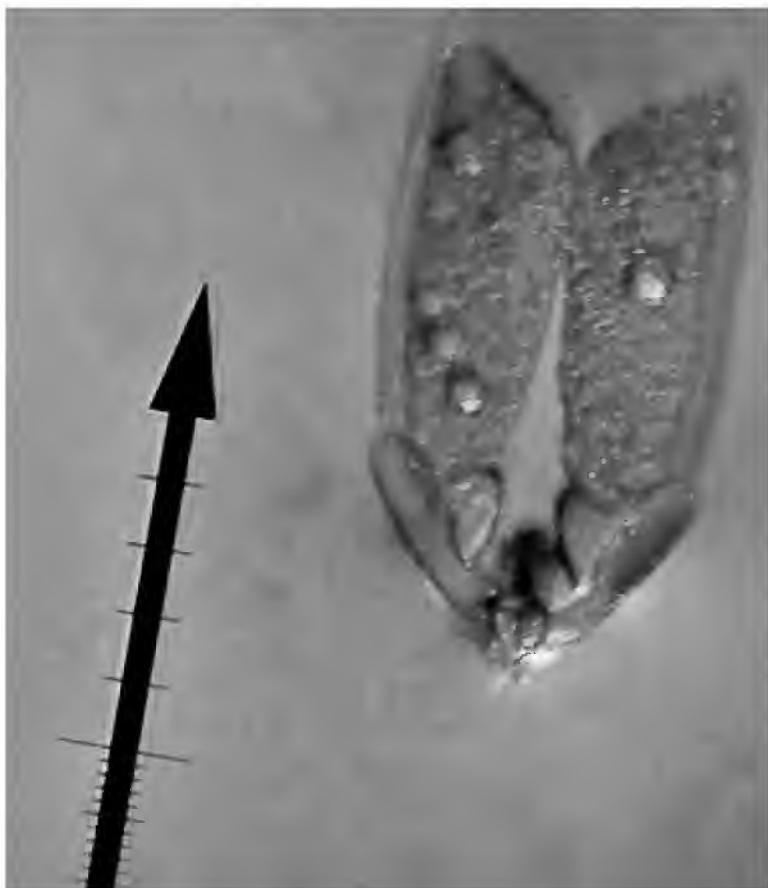
Translator/caudicle type: fb/cw

Pollinia apex type: F

Caudicle bulb: ?

Retinacula character: R

***Hoya krohniana* subsp. *lalawinanensis* Kloppenburg & Mendoza**
(unpublished) GM #151



Pollinarium enlarged 170x.

Pollinium

length	0.33 mm
widest	0.14 mm

Retinaculum

length	0.08 mm
shoulder	0.06 mm
waist	0.03 mm
hip	0.06 mm
ext.	0.03 mm

Translator

length	0.17 mm
wide	0.04 mm

Caudicle

bulb dorsal	0.05 mm
bulb depth	0.06 mm

Translator/caudicle type:
fb/cw

Pollinia apex type: TF

Caudicle bulb: C

Retinacula character: S

***Hoya apoensis* Kloppenburg & Siar 2010 Type clone**



Pollinaria enlarged about 165x.

Pollinia

length	0.32 mm
widest	0.16 mm

Retinaculum

length	0.08 mm
shoulder	0.06 mm
waist	0.05 mm
hip	0.05 mm
extensions	0.04 mm

Translators

length	0.13 mm
depth	0.04 mm
wide top	0.01 mm

Caudicle bulb top 0.09 mm

Type: G

Caudicle has broad cupped top, below resting on translator top.

Ratios: ret./poll length 4.0; poll l/w = 2.0

Translator/caudicle type: fb/cw

Pollinia apex type: T

Retinacula character: S

Hoya odetteae Kloppenburg 1998

Type flower from Ted Green, Kaaawa, HI.



This and the above picture show the pollinaria enlarged approx. 165 tines. I show this second picture because on the lower left side the ballooned, rounded translator is better depicted as it lends support to the more amber clear caudicle to which the inner end of the pollinia adheres. It also shows that the translator and caudicle are attached well down on the side (at the hip or below) of the retinaculum.

The complexities of the pollinaria are not always easy to capture with a photomicrograph.

Note: The broad structure and conformation of the dark retinaculum and where the translators and caudicles are apparently attached. The translators have rounded extended apices, the caudicles here are relatively small by comparison. The pollinia are full with rounded ends.



Pollinia

length	0.32 mm
widest	0.12 mm

Retinaculum

length	0.09 mm
shoulder	0.08 mm
waist	0.07 mm
hip	0.08 mm
extensions	0.06 mm

Translators

length	0.12 mm
depth	0.05 mm

Caudicle

bulb diam.	0.04 mm
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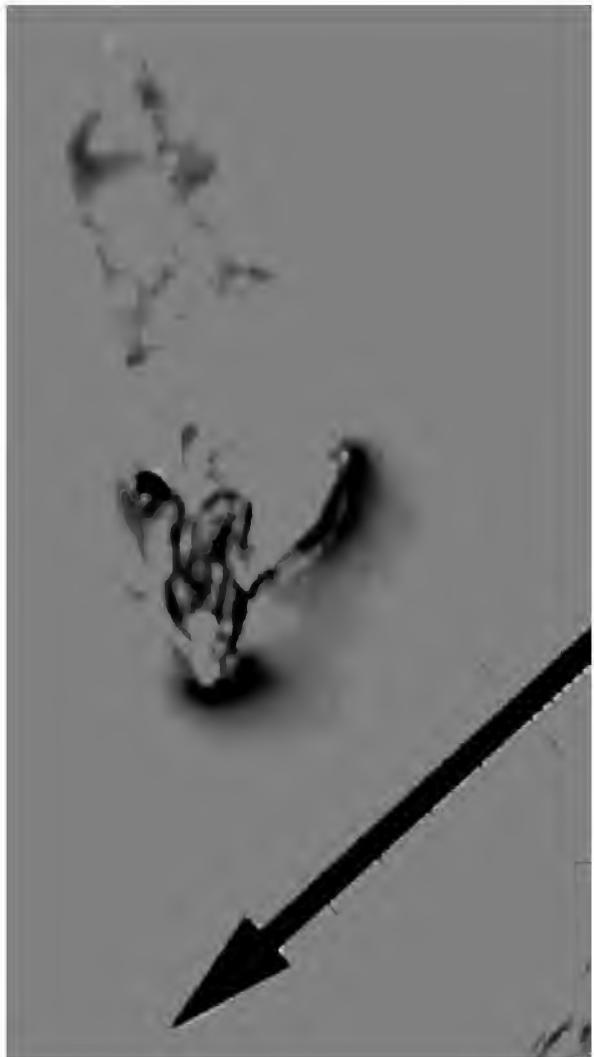
Retinacula character: S

Translator/caudicle Type: fb/cw

Pollinia inner apex type: T

Caudicle bulb: G

Hoya taywanensis Kloppenburg & Mendoza
(unpublished) GM #172



Pollinarium enlarges 180x.

Pollinium

length	0.32 mm
widest	0.12 mm

Retinaculum

length	0.09 mm
shoulder	0.10 mm
waist	0.05 mm
hip	0.07 mm
ext	0.05 mm

Translator

length	0.13 mm
widest	0.05 mm

Caudicle 0.06 mm

Translator/caudicle type: fb/cw

Pollinia inner apex type: F

Caudicle bulb: C

Retinacula character: S

***Hoya pseudoleytensis* Kloppenburg, Mendoza, Guevarra & Carandang 2013**



Pollinaria enlarged ca.
140x.

Pollinium

length	0.32 mm
widest	0.15 mm

Retinaculum

length	0.05 mm
shoulder	0.08 mm
waist	0.04 mm
hip	0.05 mm
ext.	0.04 mm

Translator

length	0.15 mm
depth	0.04 mm

Caudicle

bulb diam. 0.06 mm

Translator/caudicle

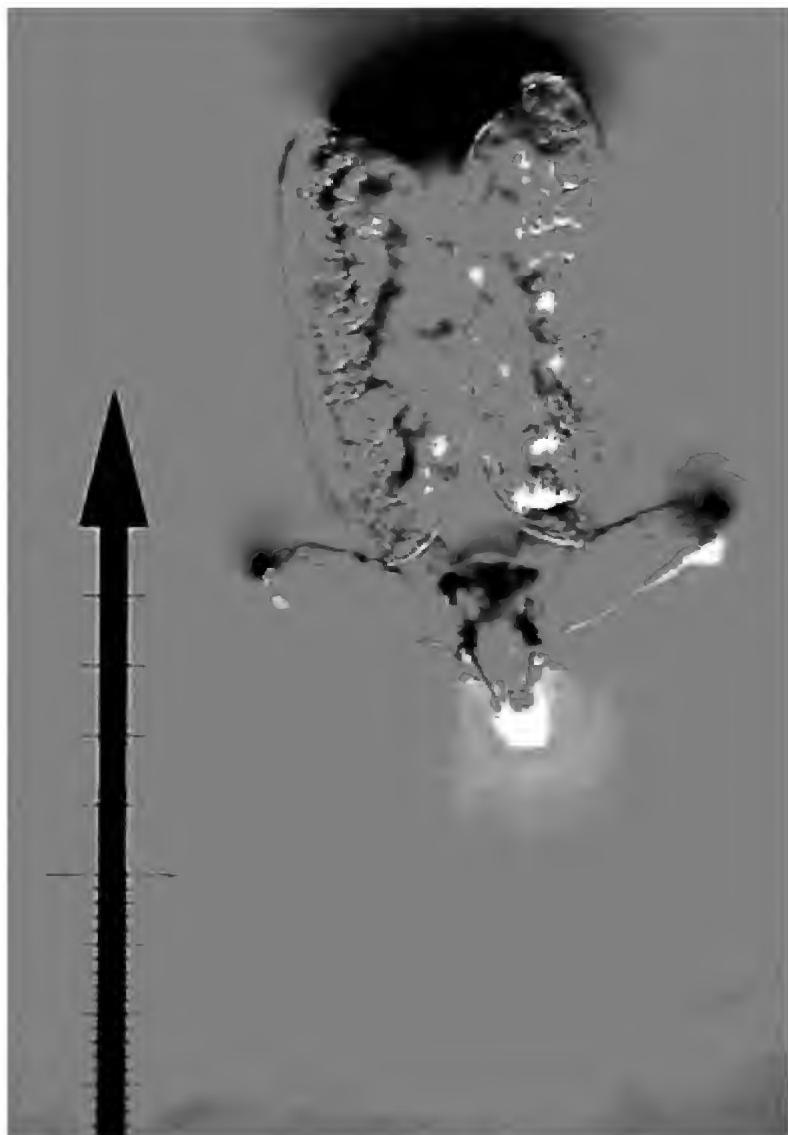
Type: fb/cw

**Pollinia inner apex type:
T**

Caudicle bulb: G

Retinacula character: S

Hoya acanthocitrina Kloppenburg & Mendoza
(unpublished) GM #102



Pollinaria enlarged ca.
170x

Pollinium

length	0.32 mm
widest	0.12 mm

Retinaculum

length	0.08 mm
shoulder	0.08 mm
waist	0.05 mm
hip	0.07 mm
ext.	0.05 mm

Translator

length	0.16 mm
depth	0.05 mm

Caudicle

bulb diam.	0.04 mm
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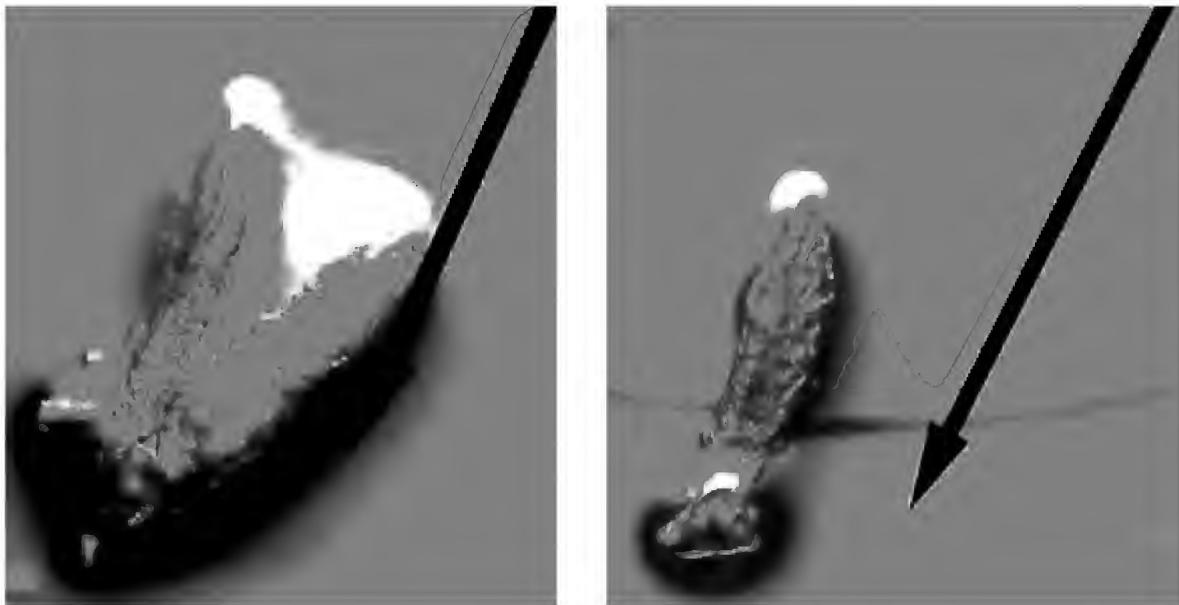
Translator/caudicle type:
fb/o

Pollinia inner apex type:
T

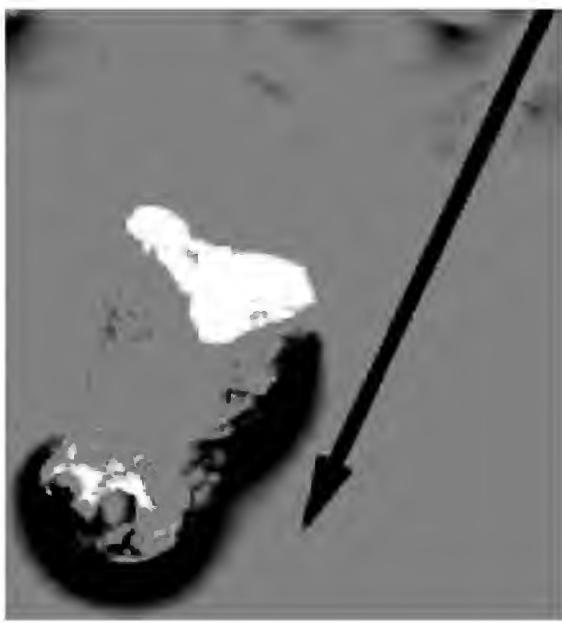
Caudicle bulb: C

Retinacula character: S

Hoya capatata Kloppenburg & Mendoza
(unpublished) GM #81



Pollinarium enlarged Upper left. 130x, right 110x and lower left 100x.



The pollinaria seemed to be a little deformed my best judgment as to the measurements is:

Pollinium

length	0.32 mm
widest	0.12 mm

Retinaculum

length	0.09 mm
shoulder	0.08 mm
waist	0.06 mm
ext	0.03 mm

Translator

length	0.11 mm
width	0.02 mm

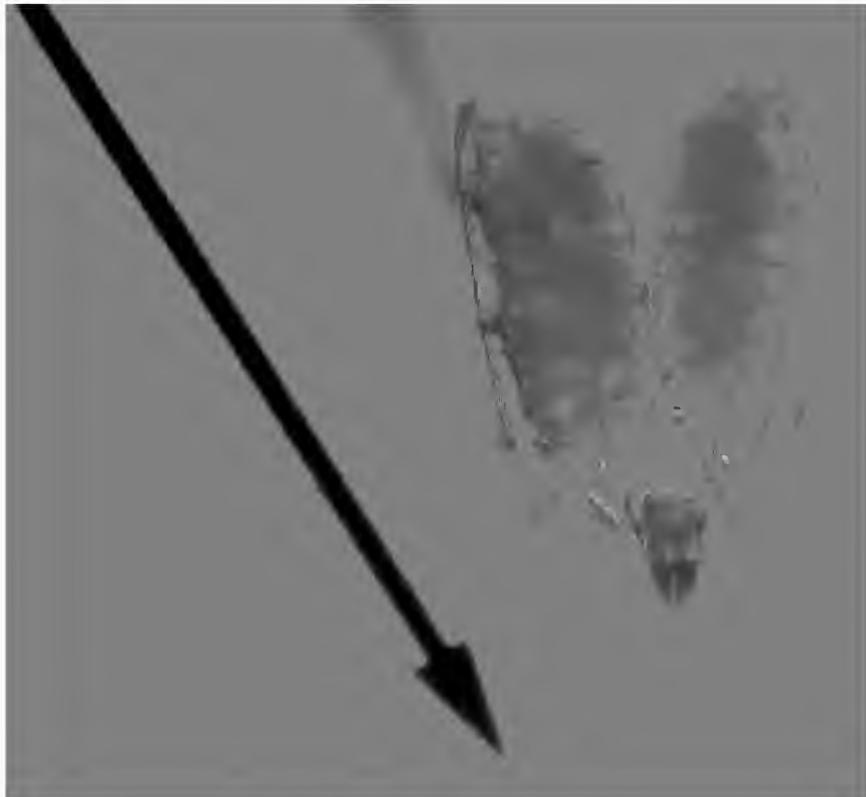
Caudicle

a cw type ca. 0.07 mm across the top

Translators appear to be l/cw
Caudicle bulb: C

Pollinia inner end type: T
Retinacula: S

Hoya biespada Kloppenburg & Mendoza 2015
GM #17



Pollinaria above enlarged ca. 180x.

Pollinium

length	0.31 mm
widest	0.13 mm

Retinaculum

length	0.07 mm
shoulder	0.06 mm
waist	0.04 mm
hip	0.05 mm
ext.	0.03mm

Translator

length	0.15 mm
depth	0.04 mm

Caudicle

bulb diam.	0.05 mm
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Translator/caudicle type: fb/o

Pollinia inner end type: T

Caudicle bulb: C

Retinacula character: HU

Hoya sp. Lisa V2

Via Torill Nyhuus March 2003 as flower cluster in alcohol thought to be close to *Hoya siphitangensis*. 8/30/03



Pollinarium enlarged about 165x. Pollinia are sharply truncated inward at the inner apices. Translators are extended and somewhat expanded at outer extremities. Caudicle are clear bulbous, and attached at the waste area of the retinaculum. The pollinarium is very small.

Pollinium

length	0.31 mm
widest	0.11 mm

Retinaculum

length	0.16 mm
shoulders	0.05 mm
waist	0.02 mm
hips	0.06 mm
extensions	0.05 mm. not well defined

Translators

length	0.16 mm
widest	0.05 mm

Caudicle

bulb diam.	0.08 mm
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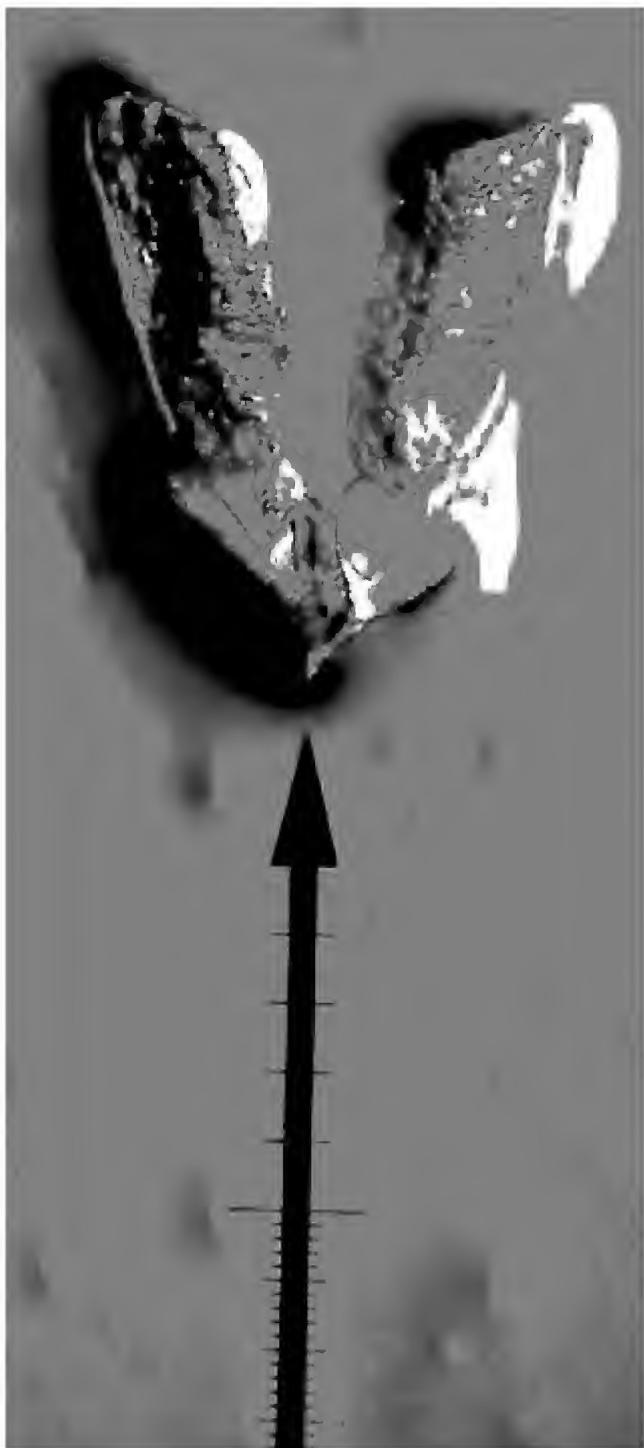
Translator/caudicle type fb/o

Pollinia inner end type: F

Caudicle bulb: G

Retinacula character: S

Hoya realensis Kloppenburg & Mendoza
(unpublished) GM #67



Pollinarium (left) enlarged ca. 220x

Pollinium

length	0.31 mm
widest	0.11 mm

Retinaculum

length	0.11 mm
shoulder	0.04 mm
waist	0.03 mm
hip	0.04 mm
ext.	0.03 mm

Translator

length	0.17 mm
widest	0.04 mm

Caudicle

bulb diam. 0.06x 0.05 mm

Translator/caudicle type: fb/cw

Pollinia end type: F

Caudicle bulb: C

Retinacula character: E

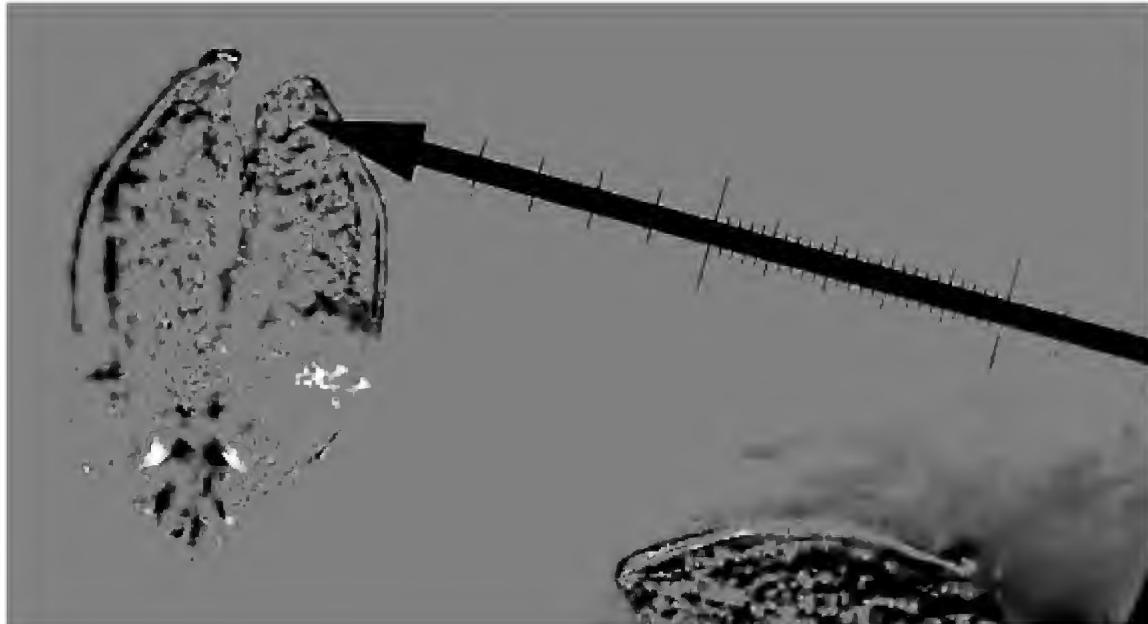
Pollinia Types 2018-2b

fb/cw. l/cw. fb/o

98. **Hoya tangerina** Kloppenborg, Mendoza & Ferreras 2014
99. **Hoya heuschkeliana** Kloppenborg 1989
100. **Hoya memoria** Kloppenborg 2004
101. **Hoya walliniana** Kloppenborg & Nyhuus 2003
102. **Hoya bifunda** subsp. **integra** Klopp., Siar, Cajano, Guevarra & Carandang 2013
103. **Hoya** sp. IML 232 Kuching Sarawak, Borneo
104. **Hoya pallilimba** Kleijn & van Donkelaar 1999
105. **Hoya** sp. IPPS 8870
106. **Hoya nabawanensis** Kloppenborg & Wiberg 2002
107. **Hoya barbonii** Kloppenborg 2014
108. **Hoya hirsuta** Kloppenborg & Mendoza 2015
109. **Hoya** sp. TG Bada, C. Sulawesi
110. **Hoya celsa** Kloppenborg, Siar, Guevarra, Cajano & Carandang 2013
111. **Hoya rosarioae** Kloppenborg & Siar 2010
112. **Hoya** sp. F 484 Kuching Borneo
113. **Hoya** sp. TN99-002 From Torill Nyhuus, Sweden
114. **Hoya unica** Kloppenborg, Mendoza & Ferreras 2013
115. **Hoya unica** subsp. **aurantiaca** Kloppenborg & Mendoza
116. **Hoya nuevaensis** Kloppenborg & Mendoza
117. **Hoya revoluta** Wight 1883
118. **Hoya yapiana** Kloppenborg 2010
119. **Hoya** sp. IPPS 1779
120. **Hoya aurea** Kloppenborg & Mendoza
121. **Hoya leticiae** Kloppenborg, Cajano & Hadsall 2015
122. **Hoya marvinii** Kloppenborg, Mendoza & Ferreras 2013
123. **Hoya acanthodissimila** Kloppenborg, Cajano & Barcelona 2015
124. **Hoya acanthominima** Kloppenborg, Mendoza & Ferreras 2013
125. **Hoya taeahwa** subsp. **tayuncisensis** Kloppenborg & Mendoza
126. **Hoya nagcarlanensis** Kloppenborg, Mendoza
127. **Hoya taeahwa** Kloppenborg & Mendoza
128. **Hoya taeahwa** subsp. **tayuncisensis** Kloppenborg & Mendoza
129. **Hoya nagcarlanensis** Kloppenborg, Mendoza
130. **Hoya caespitosa** Kloppenborg & Mendoza
131. **Hoya bulba** Kloppenborg & Mendoza
132. **Hoya liquida** Kloppenborg & Mendoza
133. **Hoya linguiforma** Kloppenborg & Mendoza
134. **Hoya acanthopenta** Kloppenborg & Mendoza
135. **Hoya cupula** Kloppenborg, Mendoza & Ferreras 2013
136. **Hoya rosarioae** subsp. **realensis** Kloppenborg & Mendoza
137. **Hoya** sp. Monina # 1 **Hoya bilobata**
138. **Hoya leyensis** Elmer ex Burton
139. **Hoya unica** subsp. **bakerensis** Kloppenborg & Mendoza
140. **Hoya pubacupula** Kloppenborg Mendoza

141. ***Hoya picta*** Miquel 1856
142. ***Hoya bilobata*** Schlechter 1908
143. *Hoya bilobata* ? Monina #2
144. ***Hoya amorosoae*** T. Green & Kloppenburg 2014
145. *Hoya* sp. DS #1
146. ***Hoya brittonii*** Kloppenburg, 1992
147. ***Hoya minimapollinaria*** Kloppenburg & Mendoza
148. ***Hoya reyesii*** Medina & Kloppenburg 2016

Hoya tangerina Kloppenburg, Mendoza & Ferreras 2014



Pollinium enlarged ca. 160x.

Pollinium

length	0.31 mm
widest	0.13 mm

Retinaculum

length	0.06 mm
shoulder	0.06 mm
waist	0.04 mm
hip	0.06 mm
ext.	0.04 mm

Translator

length	0.13 mm
depth	0.03 mm

Caudicle

top cup	0.07 mm
length	0.07 mm

Translator/caudicle type: fb/cw

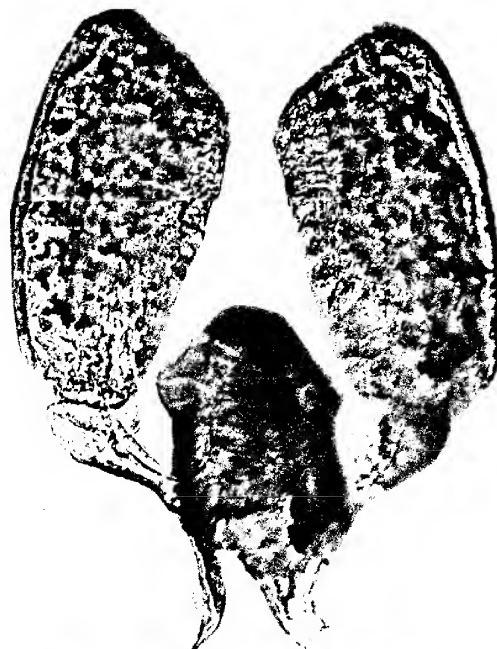
Pollinia inner end type: RT

Caudicle bulb: G

Retinacula character: S

***Hoya heuschkeliana* Kloppenburg 1989**

Pollinarium from Type clone (CAHUP) collected by Professor Juan V. Pancho at the north portion of Lake Bulusan, Sorsegon Prov., Luzon, Philippines.



Pollinium

length:	0.30 mm
widest:	0.15 mm

Retinaculum

length:	0.15 mm
shoulder:	0.15 mm
waist:	0.13 mm
hip:	0.13 mm
ext.:	0.13 mm

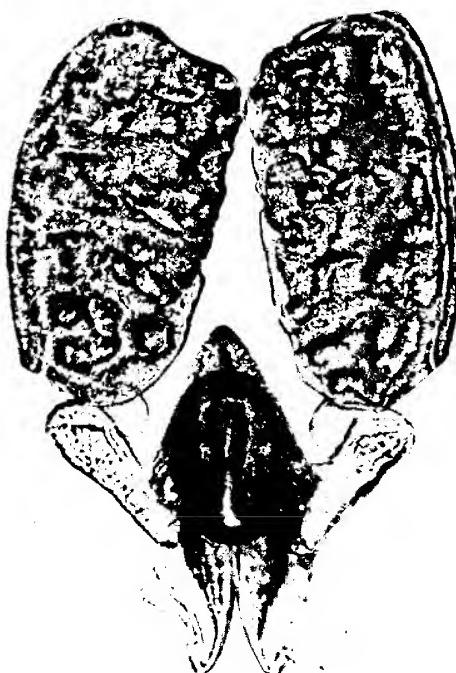
Translators

length:	0.12 mm
depth:	0.05 mm

Caudicle

bulb diam.:	0.05 mm
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Magnified approximately 165x.



Pollinium

length:	0.30 mm
widest:	0.16 mm

Retinaculum

length:	0.17 mm
shoulder:	0.11 mm
waist:	0.12 mm
hip:	0.10 mm
ext.:	0.011 mm

Translators

length:	0.13 mm
depth:	0.05 mm

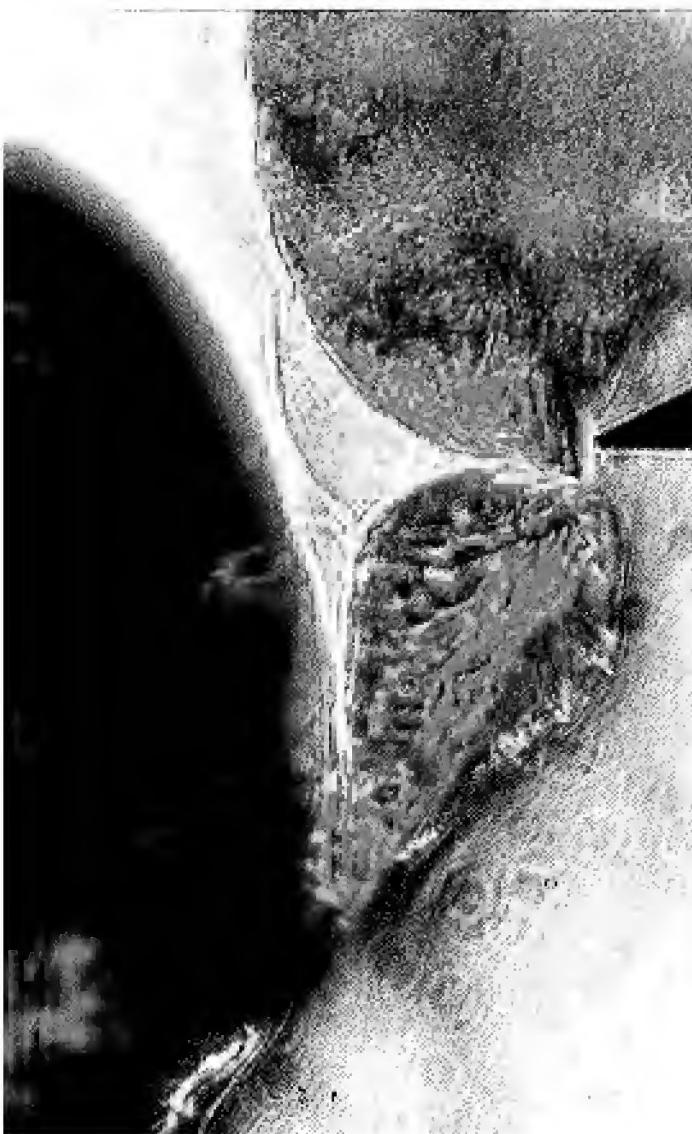
Caudicle

bulb diam.:	0.05 mm
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This is the yellow flower form of this species that opens campanulate, and thus shows some genetic difference. Same magnification.



Pollinaria enlarged about 165x. This is a relatively small pollinaria with many distinctive and individualistic features. The pollinia are short and broad with apices truncated, the translators are long and wide on the top supporting a clear caudicle. Here you can note the distinctive "pollywog" like shape of the caudicles, a bulbous end into which the ends of the pollinia adhere and a narrow tail extending into the Retinacula. The retinacula is broad with widely spaced extensions.



This is a very enlarged view of the area where the pollinia are attached (stuck might be a better term) into the clear caudicle and the supporting translator and the adjacent part of the dark retinacula. This has been enlarged about 660X. The translucent caudicle is so clear that it just casts a shadow over the apical area of the pollinia, it also casts a shadow on the broad top of the translator which is shaped like a wedge with the broad side on top supporting the tail of the caudicle and narrows as it approaches the retinaculum.

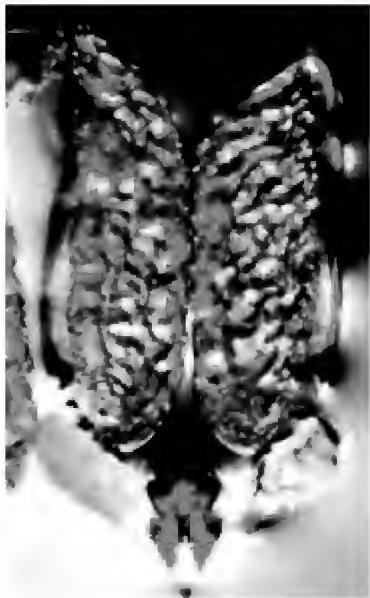
Translator/caudicle type: f/o

Pollinia inner end type: T

Caudicle bulb: C

Retinacula character: R

Hoya memoria Kloppenburg 2004
Type clone, pollinarium from flower of clone Philip. 3.



Pollinarium enlarged about 165x. The retinaculum of this species is relatively small but here the translators by contrast are large. This is a small pollinarium.

Pollinia

length	0.30 mm
widest	0.11 mm

Retinaculum

length	0.05 mm without the extensions.
shoulder	0.05 mm
waist	0.04 mm
hip	0.05 mm +
extensions	0.04 mm strong, well formed

Translator

length	0.12 mm
deepest	0.04 mm
wide	0.02 mm

Caudicle bulb diameter 0.06 mm. tear drop shaped.

Type: clear

Translator/caudicle type: fb/cw

Pollinia inner end type: F

Caudicle bulb: C

Retinacula character: S

Hoya walliniana Kloppenburg & Nyhuus 2003 Type clone



A pollinarium enlarged about 165x. The pollinia are inwardly truncate on the inner apex. The translators are long and narrow with large clear caudicles. The appears to have a bifid head but I believe it is the viewing angle. Well developed head and waste, extensions are tight together and not well developed.

Pollinia

Length	0.30 mm
Widest	0.13 mm

Retinaculum

Length	0.10 mm
Shoulders	0.04 mm
Waist	0.02 mm
Hip	0.06 mm
Extensions	0.05 mm

Translators

Length	0.15 mm
Wide	0.02 mm

Caudicle bulb. 0.10 x 0.05 mm
Type: C

Translator/caudicle type: l/o

Pollinia inner end type: F

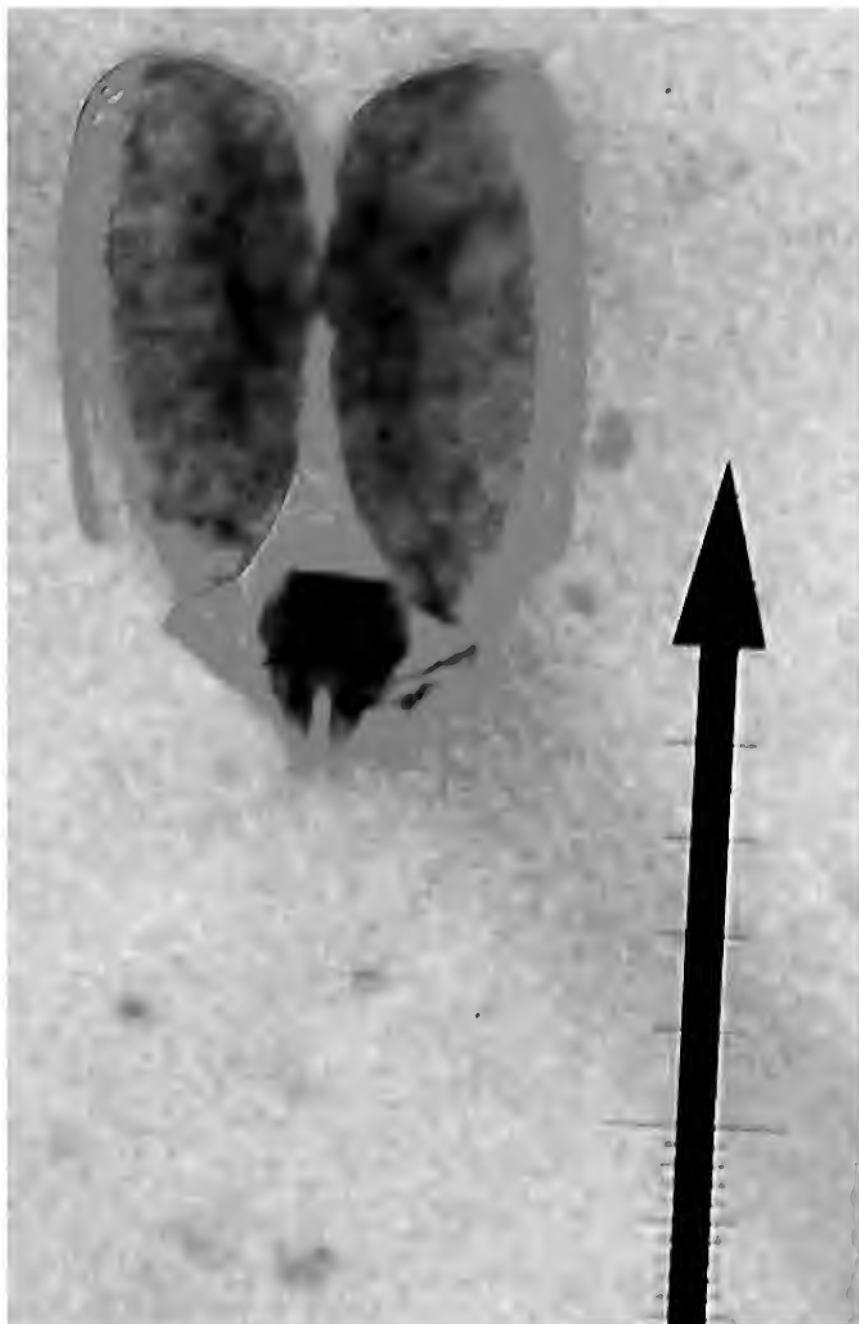
Caudicle bulb: C

Retinacula character: S

Another photomicrograph of the Pollinarium to show the unusual arm formations in the head area of the retinaculum the unusual leg formations below the waist and long and lightly differentiated (extensions).



***Hoya bifunda* subsp. *integra* Kloppenburg, Siar, Cajano, Guevarra
& Carandang 2013 Type clone**



Pollinarium enlarged
ca. 270x.

Pollinium

length 0.29 mm
widest 0.14 mm

Retinaculum

length 0.06 mm
shoulder 0.09 mm
waist 0.06 mm
hip 0.07 mm
ext. 0.04 mm

Translator

length 0.07 mm
depth 0.01 mm

Caudicle

bulb. diam. 0.07 mm
Type: C

Ratios:

p/r 4.8
p/w 2.1

Translator/caudicle
type: l/o

Pollinia inner end
type: R

Caudicle bulb: G ?

Retinacula character: S

Hoya sp. IML 232 Kuching Sarawak, Borneo
Collector Peter Tsang; flower via Ann Wayman.



Magnified approximately 165x.

Pollinium

length:	0.29 mm
widest:	0.12 mm

Retinaculum

length:	0.06 mm
shoulder:	0.05 mm
waist:	0.02 mm
hip:	0.04 mm
ext.:	0.03 mm

Translators

length:	0.17 mm
depth:	0.04 mm

Caudicle

bulb diam.: 0.07 mm

Translator/caudicle type: fb/cw

Pollinia inner end type: T

Caudicle bulb: C

Retinacula character: S

Hoya pallilimba Kleijn & van Donkelaar 1999
From Type clone.



Pollinarium enlarged about 165x.

Pollinia

length	0.29 mm
widest	0.12 mm

Retinaculum

length	0.08 mm to the extensions
shoulder	0.05 mm
hip	0.04 mm
waist	0.05 mm
extensions	0.04 mm

Translator

length	0.14 mm
widest	0.04 mm

Caudicle

bulb diameter 0.06 mm

Translator/caudicle type: fb/cw

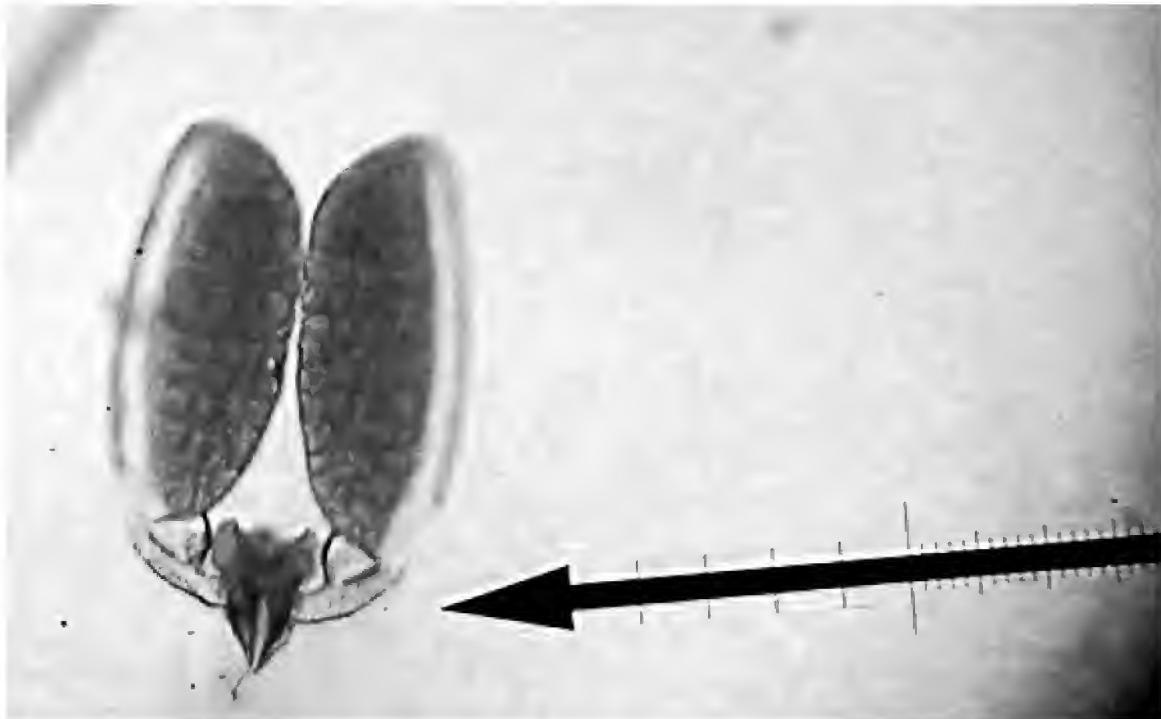
Pollinia inner end type: T

Caudicle bulb: C

Retinacula character: LS

Hoya sp. IPPS 8870

Via Torill Nyhuus, March 2007. flowers in Kew solution, data 4/1/07



Pollinaria enlarged about 85x Pellucid edge does not extend all the way down side, but continues over the inner pollinia apex.

Pollinium

length	0.29 mm
widest	0.11 mm

Retinaculum

length	0.07 mm
shoulder	0.08 mm
waist	0.05 mm
hip	0.06 mm
ext.	0.03 mm

Translator

length	0.10 mm
depth	0.02 mm

Caudicle

bulb diam.	0.04 mm
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Translator/caudicle type: l/cw **Pollinia inner end type:** R **Caudicle bulb:** C
Retinacula character: HU

Hoya nabawanensis Kloppenburg & Wiberg 2002

A new species from Borneo 2002

Material from **Type** clone.



Pollinarium enlarged about 165x. Pollinia are wide, translators long and distinctive and the retinaculum short.

Pollinia

length	0.28 mm
widest	0.12 mm

Retinaculum

length	0.17 mm
head	rounded with no distinct shoulder.
waist	0.02 mm ca.
hips	0.04 mm
extensions	up to 0.03 mm

Translator

length	0.15 mm
widest	0.13 mm

Caudicle

bulb diameter 0.05 mm ca.

Translator/caudicle type: fb/cw **Pollinia end type:** T **Caudicle bulb:** C

Retinacula character: LS

Hoya carbonii Kloppenburg 2014



Pollinarium enlarged about 125x.
Inner pollinia lobes are truncate,
translators are long and narrow
with clear caudicles visible.

Pollinium

length	0.28 mm
widest	0.11 mm

Retinaculum

length	0.13 mm
head	0.04 mm
hip	0.05 mm
ext.	0.02 mm

Translators

length	0.14 mm
widest	0.003 mm

Caudicle

bulb diam.	0.05 mm
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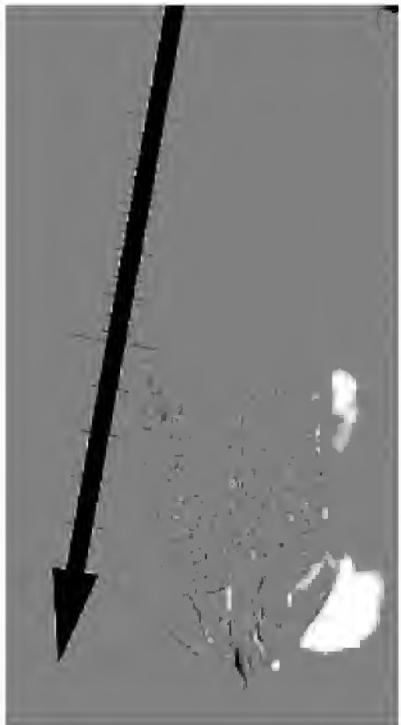
Type: Clear

Translator/caudicle type: l/o

Pollinia inner end type: T

Retinacula type: LS

Hoya hirsuta Kloppenburg & Mendoza 2015



Pollinarium enlarged ca. 150x.

Pollinium:

length	0.27 mm
widest	0.11 mm

Retinaculum:

length	0.06 mm
shoulder	0.03 mm
waist	0.01 mm
hip	0.03 mm
ext.	0.03 mm

Translators:

length	0.14 mm
widest	0.03 mm

Caudicle:

oval	0.04 x 0.06 mm
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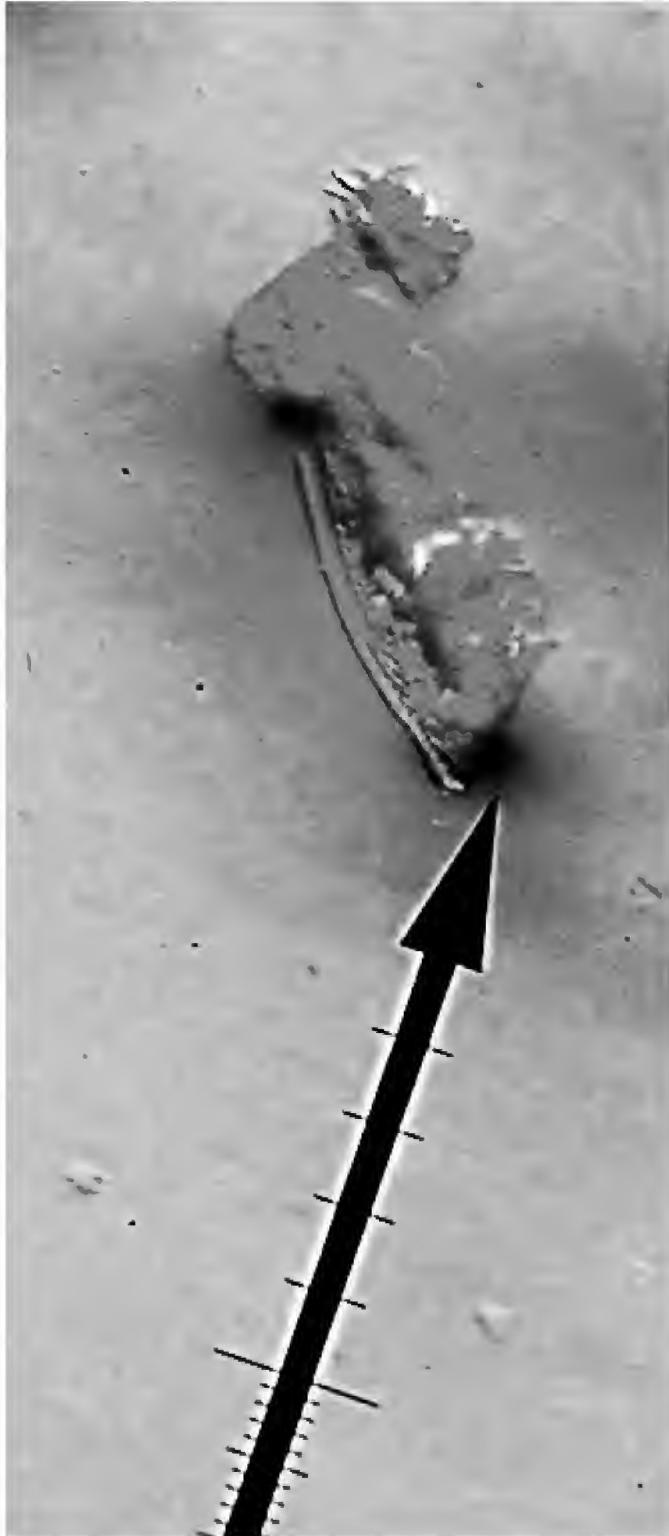
Type: C (clear)

Translator/caudicle type: fb/cw.

Pollinia end type: T

Retinacula type: LS (long shoulders)

Hoya sp. TG Bada, C. Sulawesi
via mail 6/14/06 with stem, peduncle and flowers



Pollinaria enlarged. Note reticule
arrow is 0.1 mm. long and base 0.05
mm. wide.

Pollinium

length	0.27 mm
widest	0.11 mm

Retinaculum

length	0.06 mm
shoulders	0.06 mm
waist	0.04 mm
hip	0.05 mm
ext.	0.04 mm

Translators

length	0.11 mm
widest	0.04 mm

Caudicle

bulb diam.	0.07 mm
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Translator/caudicle type: fb/cw.

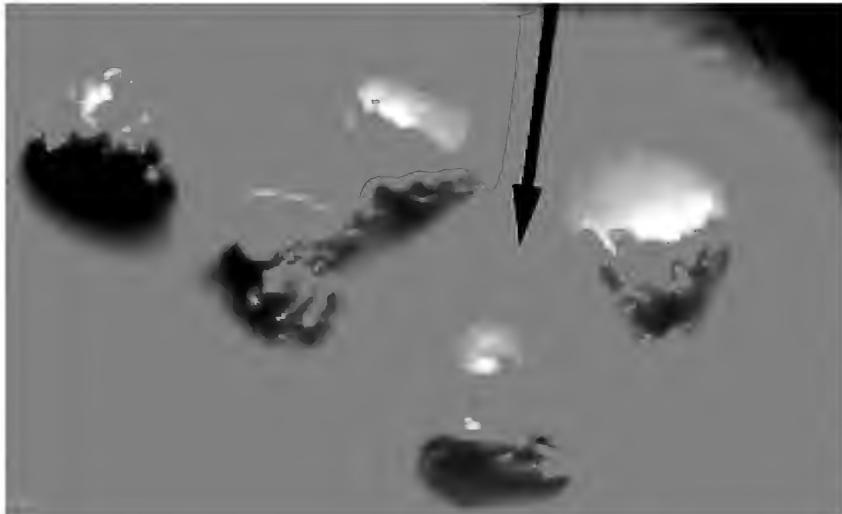
Pollinia end type: F

Caudicle bulb: G ?

Retinacula character: S

Note the clavate end of the pollinium. the long rather wide translators (fiddle shaped) and small wide retinaculum.

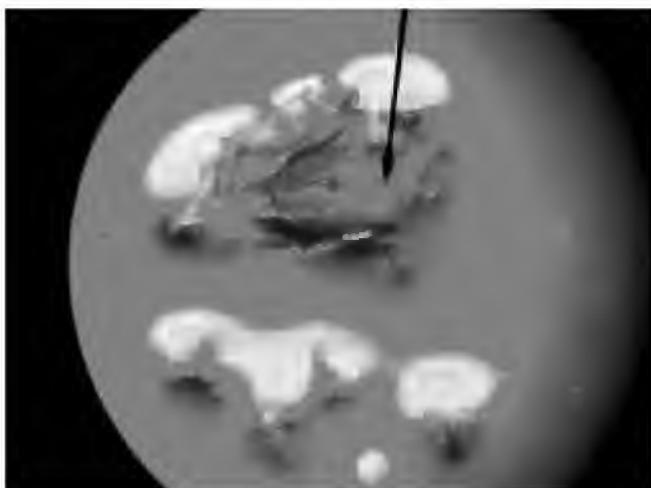
Hoya celsa Kloppenburg, Siar, Guevarra, Cajano & Carandang 2013



None of the pollinia were attached to the retinacula. The translators are typical of the Section Acanthostemma.

Retinaculum

length	0.12 mm
shoulder	0.09 mm
waist	0.06 mm
hip	0.09 mm
ext.	0.09 mm



Translator

length	0.18 mm
depth	0.05 mm

Translator/caudicle type: fb/cw

In the top of this photo is the anther with pollinia (2) it is difficult to determine the precise measurements but here is my best estimate.

length	0.26 mm
widest	0.10 mm

Hoya rosarioae Kloppenburg & Siar 2010 Type clone
obscura Elmer ex Burton 1986
var. longipedunculata
Flowered at Fresno, CA. USA.



Magnified approximately 165x.

Pollinium

length:	0.26 mm
widest:	0.07 mm

Retinaculum

length:	0.11 mm
shoulder:	0.04 mm
waist:	0.03 mm
hip:	0.05 mm
ext.:	0.02 mm

Translators

length:	0.16 mm
depth:	0.02 mm

Caudicle

bulb diam.: 0.04 mm

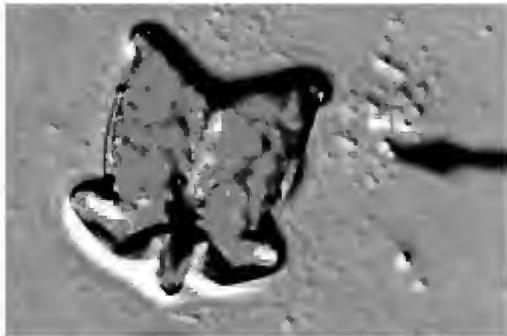
Translator/caudicle type: fb/o

Pollinia inner end type: T

Caudicle bulb: C

Retinacula character: LS ?

Hoya sp. F 484 Kuching Borneo



A poor photo of the pollinarium enlarged about 85 times. From other date:

Pollinia

length	0.26 mm.
widest	0.14 mm

Retinaculum

length	0.07 mm.
shoulder	0.04 mm.
waist	0.03 mm.
hip	0.05 mm.
ext	0.03 mm.

Translators

length	0.14 mm.
depth	0.04 mm.

Caudicle

bulb diam.	0.03 mm.
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Translator/caudicle type: fb/cw

Pollinia inner end type: F

Caudicle bulb: ?

Hoya sp. TN99-002 From Torill Nyhuus, Sweden

via Nathalie Simonsson. Photos 3/25/05 Roll 328

Pollinarium with Olympus microscope. Pollinium are broad with rounded-truncate inner apices. Caudicles are clear supported by relatively heavy translators. Retinaculum is of proportional size with rounded head.



Pollinarium
enlarged about 165x.

Pollinium

length	0.26 mm
widest	0.12 mm

Retinaculum

length	0.08 mm
shoulder	0.05 mm
waist	0.03 mm
hip	0.04 mm
ext.	0.05 mm

Translators

length	0.09 mm
depth	0.03 mm

Caudicle

bulb diam. 0.05 mm

Translator/caudicle type: fb/cw

Pollinia inner end type: F

Caudicle bulb: C

Retinacula character: LS



Pollinium enlarged ca, 240x.

Pollinium

length	0.26 mm
widest	0.10 mm

Retinaculum

length	0.05 mm
shoulder	0.04 mm
waist	0.03 mm
hip	0.04 mm
ext	0.02 mm

Translator

length	0.13 mm
widest	0.04 mm

Caudicle

Top	0.05 mm
Depth	0.07 mm

Type: C

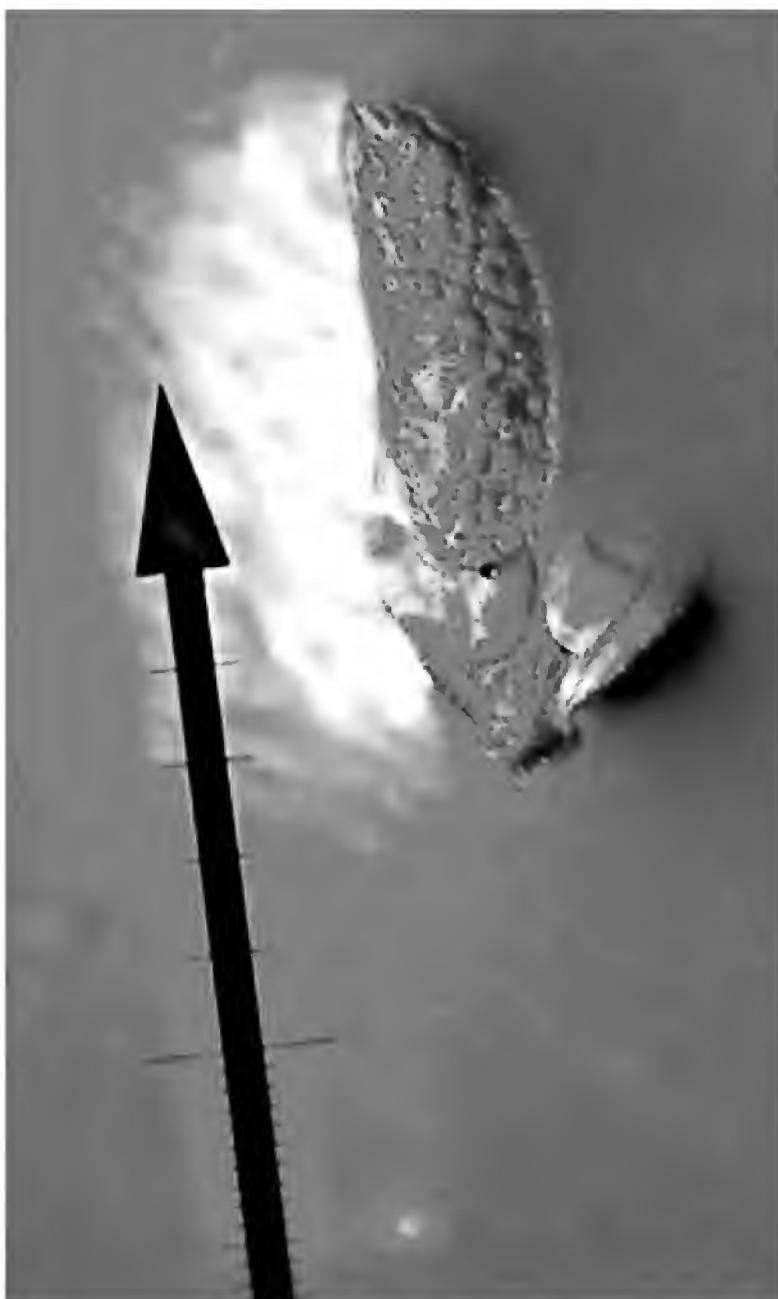
Translator/caudicle Type:
fb/cw

Pollinia inner end type: T

Caudicle bulb: C

Retinacula character: LS

Hoya unica subsp. aurantiaca Kloppenburg & Mendoza
(unpublished) GM #88



Pollinaria enlarged ca.
230x.

Pollinium

length	0.26 mm
widest	0.10 mm

Retinaculum

length	0.06 mm
shoulder	0.03 mm
waist	0.02 mm
hip	0.03 mm
ext.	0.01 mm

Translator

length	0.13 mm
widest	0.03 mm

Caudicle

bulb top	0.04 mm
depth	0.07 mm

Type: C

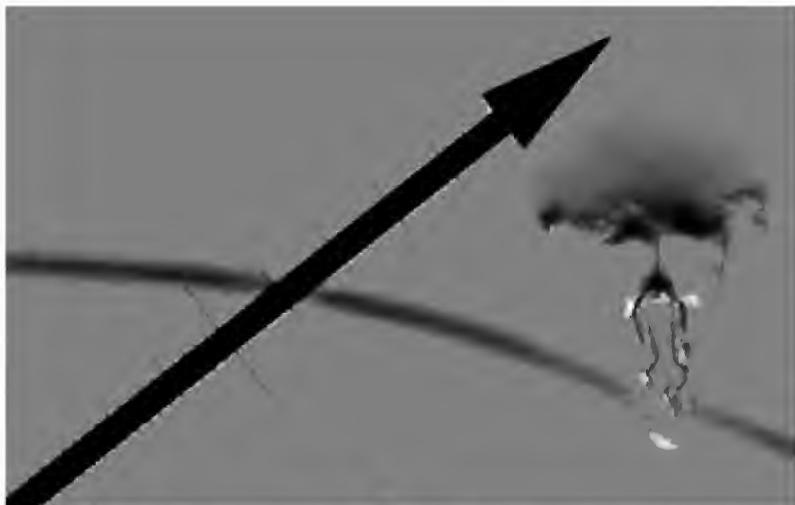
Translator/caudicle type:
fb/cw

Pollinia end type: T

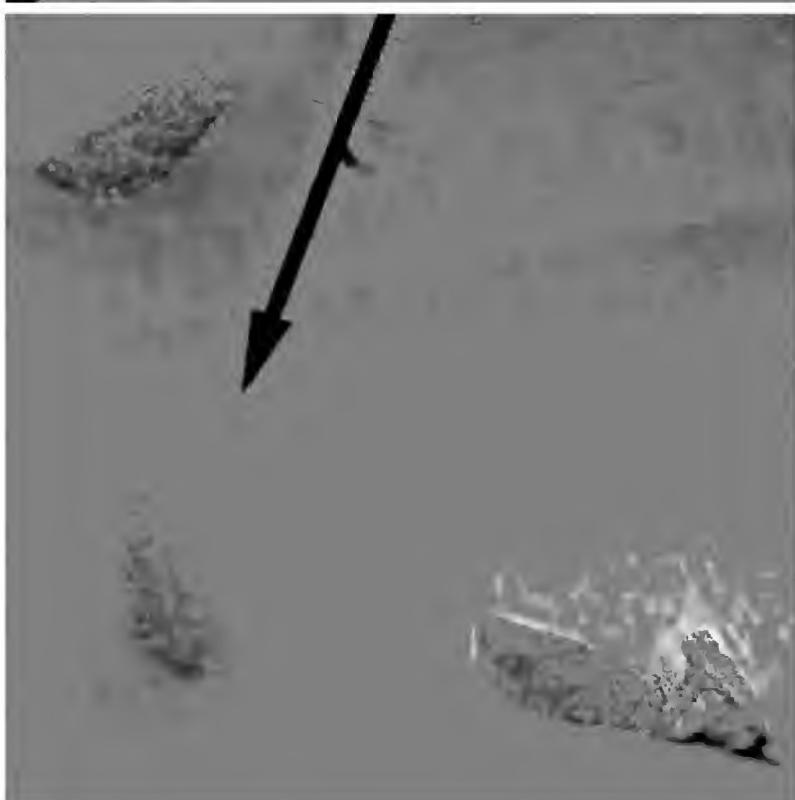
Caudicle bulb: C

Retinacula character: LS

Hoya nuevaensis Kloppenburg & Mendoza
(unpublished) GM #92



Retinaculum, translators and caudicle enlarged ca, 180x.



Two pollinium and a pollinarium lower right enlarged ca. 100x.

Pollinium

length	0.25 mm
widest	0.10 mm

Retinaculum

length	0.08 mm
shoulder	0.04 mm
waist	0.02 mm
hip	0.03 mm
ext.	0.01 mm

Translator "fb"

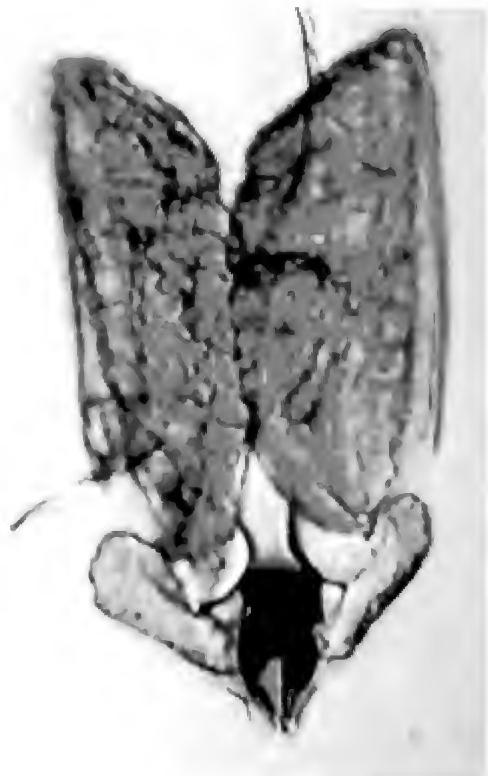
length	0.15 mm
wide	0.03 mm

Caudicle "cw"

top	0.05 mm
depth	0.06 mm

Pollinia end type: T

Caudicle bulb: C
Retinacula character: LS
Hoya revoluta Wight 1883



The pollinarium enlarged about 165x. The pollinia inner apexes are truncated inwardly. The translators are long and with bulb-like outer apexes. The clear caudicle is clearly defined. The retinaculum has a broad head and well developed extensions.

Pollinium

length	0.25 mm
widest	0.11 mm

Retinaculum

length	0.05 mm
shoulders	0.05 mm
hip	0.04 mm
waist	0.05 mm
ext.	0.04 mm

Translators

length	0.11 mm
widest	0.04 mm

Caudicle

bulb diam.	0.05 mm
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Type: C

Translator/caudicle type: fb/o

Pollinia apex type: F

Caudicle bulb: C

Retinacula character: S

Pollinarium greatly enlarged. One pollinia missing. Each fine line in the background scale represents 1/100 of a millimeter.



Hoya yapiana Kloppenburg 2010
Type clone



Above two pollinaria the arrow on scale pointer is 0.1 mm. long

Pollinium

length	0.25 mm
widest	0.12 mm

Pollinia apex type: T

Translator/caudicle type: fb/cw

Retinaculum

length	0.06 mm (head to crotch)
shoulders	0.04 mm
waist	0.03 mm
hip	0.04 mm
ext	0.04 mm

Caudicle bulb: C

Retinacula character: LS

Translators

length	0.10 mm
widest	0.04 mm

Caudicle

Outer length 0.10 mm
Bulb at top 0.06 mm

In size this pollinarium is close to *Hoya revoluta* Wight but the outer lobe of the corona of our species is not divaricate. **Type: C**

***Hoya* sp. IPPS 1779**

Flower from Ted Green, plant from Sumatra as *Hoya incurvula* Schlechter.



Pollinarium enlarged about 165x. The pollinia are angled so their true width is not revealed in this photo. This is a very small pollinarium.

Pollinia

length	0.25 mm
widest	0.10 mm

Retinaculum

length overall	0.07 mm
shoulders	0.05 mm
waist	0.03 mm
hips	0.04 mm
extensions	0.03 mm at least.

Translator

length	0.09 mm
width	0.03 mm relatively broad on top.
depth	0.04 mm almost bowl shaped.

Caudicle

bulb diam. 0.07 mm clear and relatively large.

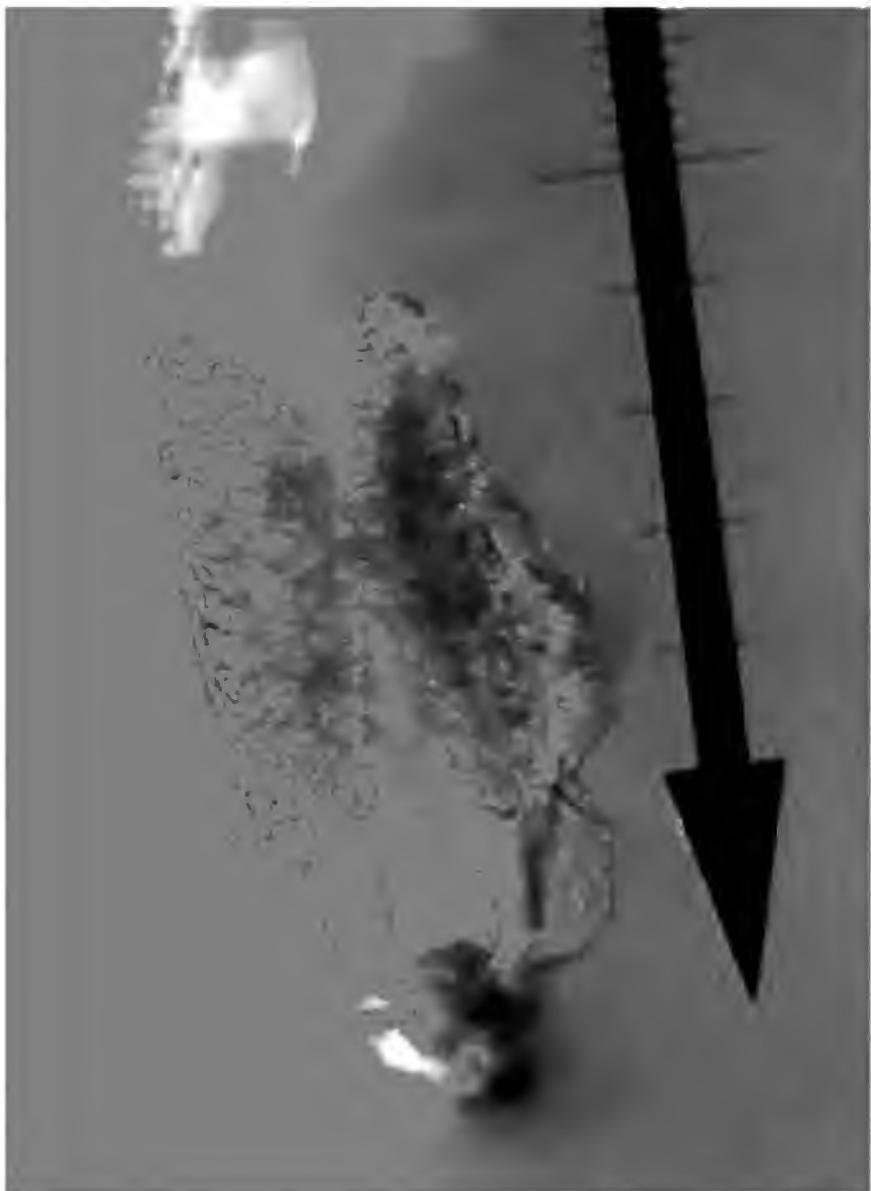
Caudicle bulb Type: granulate "G"

Translator/caudicle type: fb/o

Pollinia apex type: F

Retinacula character: S

Hoya aurea Kloppenburg & Mendoza
(unpublished) GM #11



Pollinaria
enlarged ca. 310x.

Pollinium
length 0.24 mm
widest 0.07 mm

Retinaculum
length 0.04 mm
shoulder 0.04 mm
hip 0.03 mm
waist 0.04 mm
ext. 0.02 mm

Translator
length 0.13 mm
depth 0.04 mm

Caudicle
bulb 0.04 mm

**Translator/
Caudicle Type:**
fb/cw

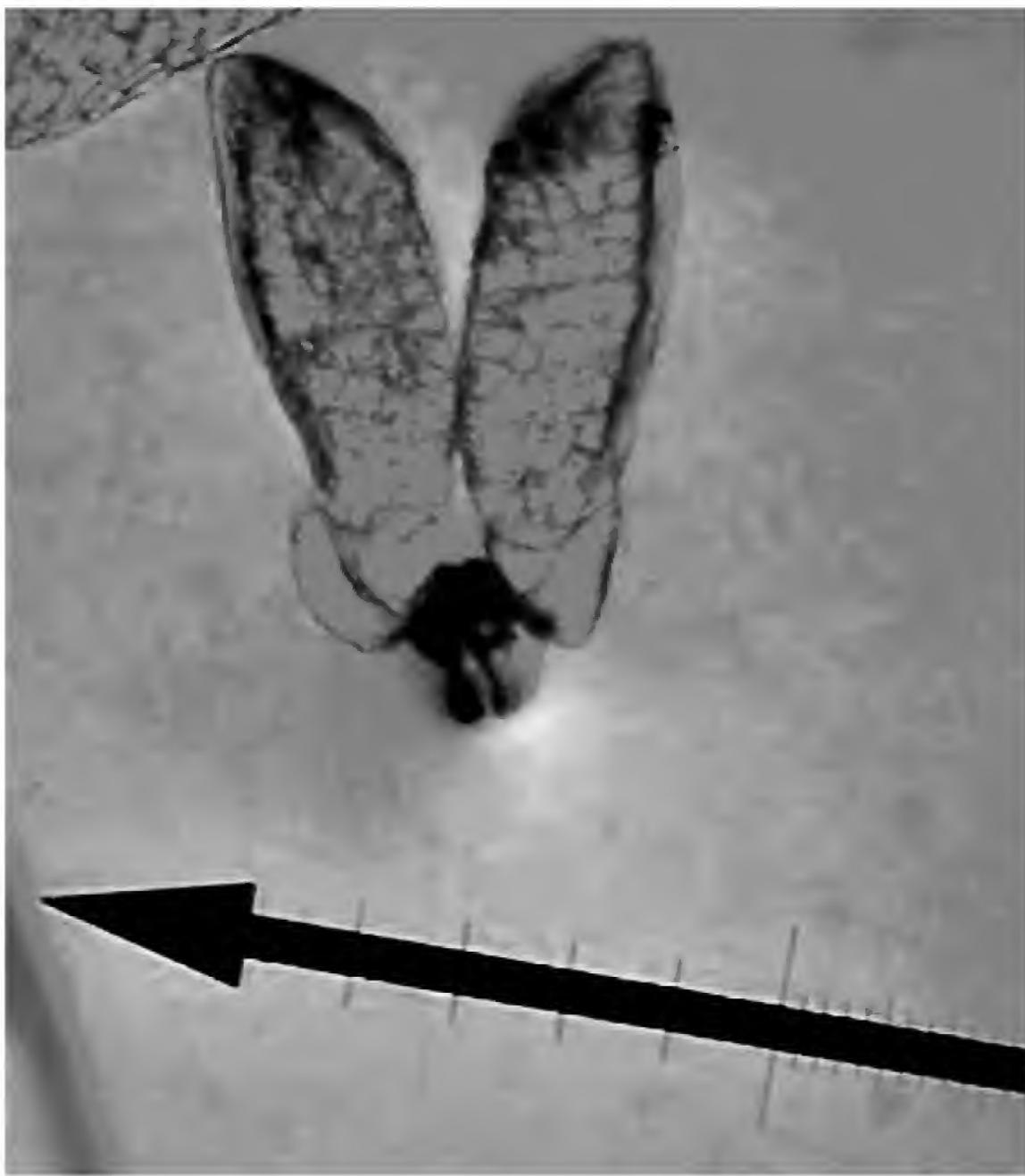
Ratios: p/w 3.4
p/r 6.0

**Pollinia inner end
type:** T

Caudicle bulb: G

Retinacula character: S

***Hoya leticiae* Kloppenborg, Cajano & Hadsall 2015**



Pollinium enlarged ca. 320x.

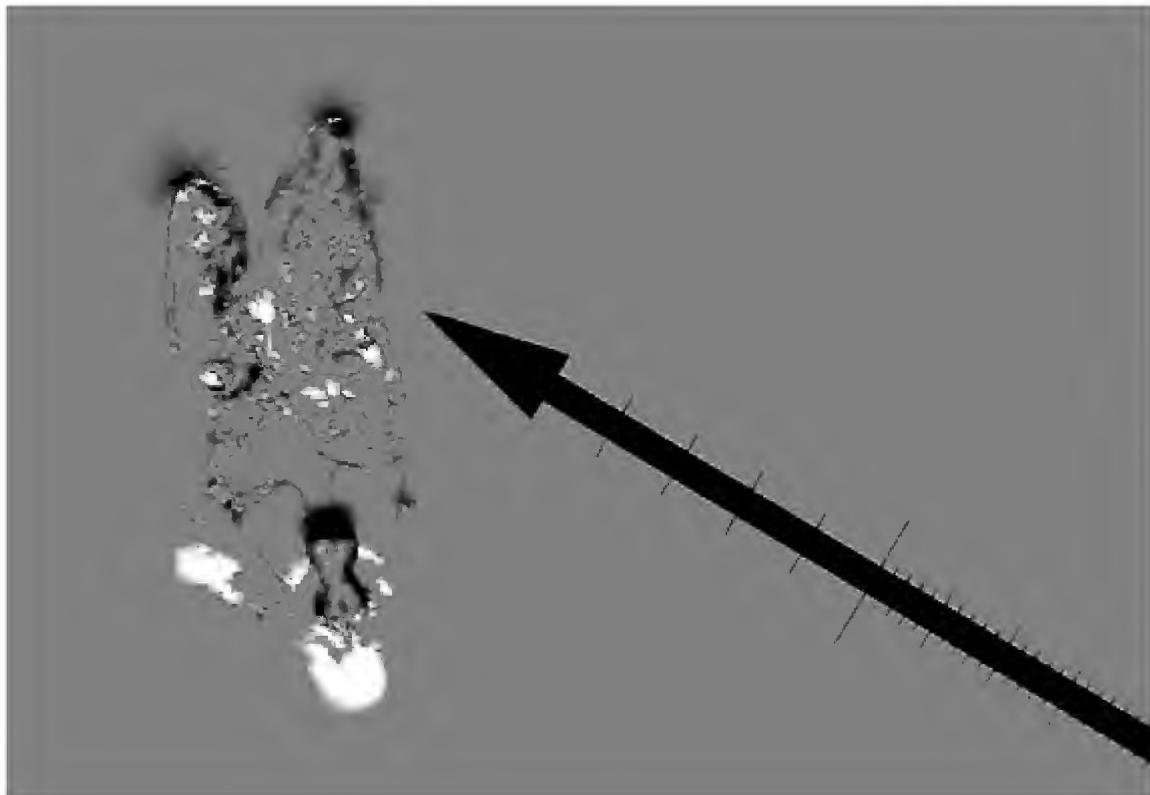
Pollinium
length 0.24 mm

Retinaculum
length 0.04 mm

widest	0.10 mm	shoulder	0.12 mm
Translator		waist	0.08 mm
length	0.08 mm	hip	0.09 mm
widest	0.03 mm	ext	0.03 mm
		Caudicle	
		bulb. diam.	0.04 mm
		Bulb:	C

Translator/caudicle type: fb/o

Pollinia end type: T.....(tapered inward).



Pollinaria enlarged ca. 138x.

Pollinium

length	0.24 mm
widest	0.08 mm

Retinaculum

length	0.07 mm
shoulder	0.03 mm
waist	0.02 mm
hip	0.03 mm
ext.	0.02 mm

Translator

length	0.13 mm
widest	0.04 mm

Caudicle bulb: C

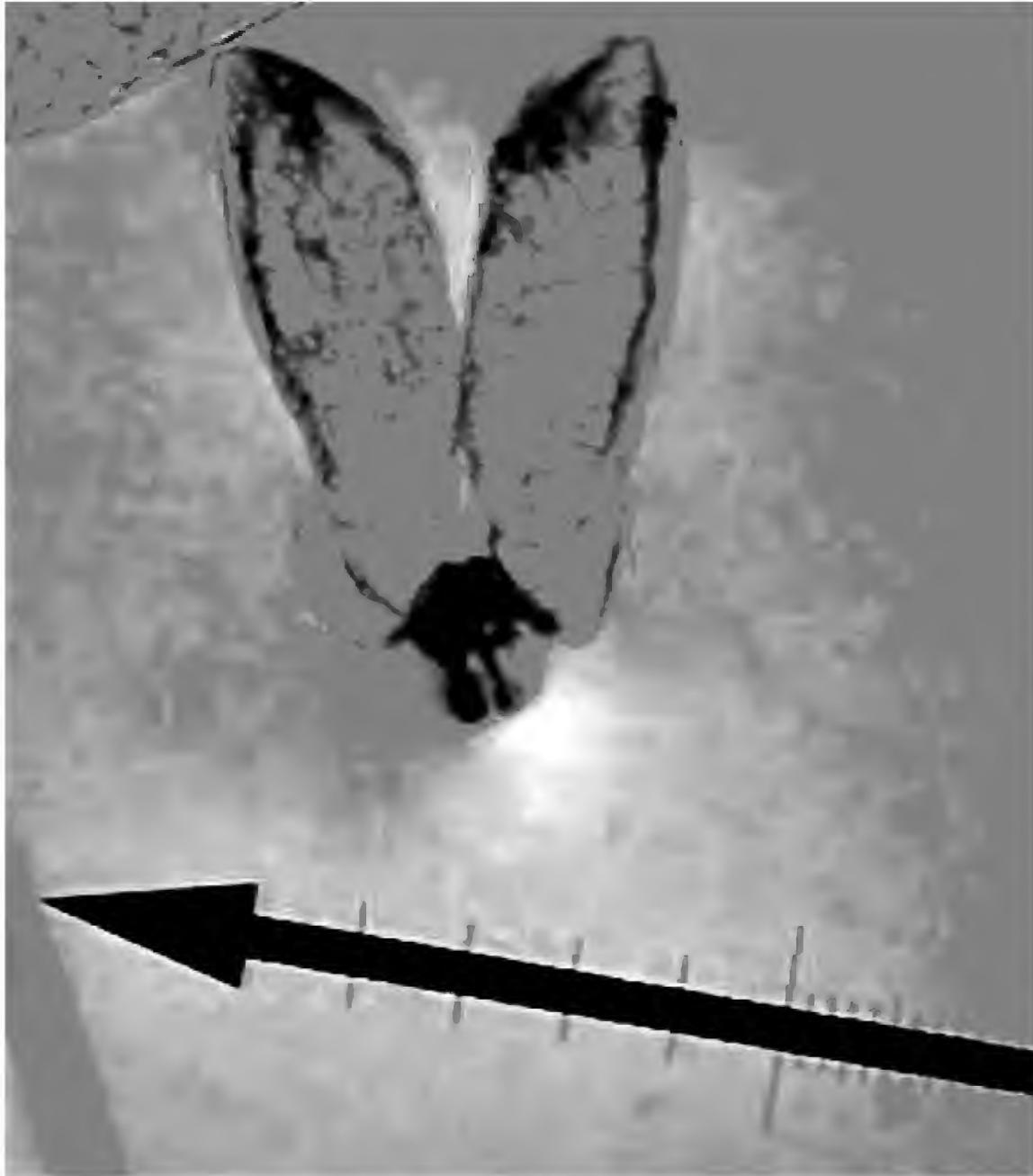
Caudicle

bulb diam. 0.05 mm **Retinacula character: R**

Translator/caudicle type: fb/cw

Pollinia inner end type: RF

***Hoya acanthodissimila* Kloppenburg, Cajano & Barcelona 2015**
(unpublished)



Pollinium enlarged ca. 320x.

Pollinium

length	0.24 mm
widest	0.10 mm

Retinaculum

length	0.04 mm
shoulder	0.12 mm

Translator	length	0.08 mm	waist	0.08 mm
	widest	0.03 mm	hip	0.09 mm
			ext	0.03 mm
			Caudicle	
			bulb. diam.	0.04 mm

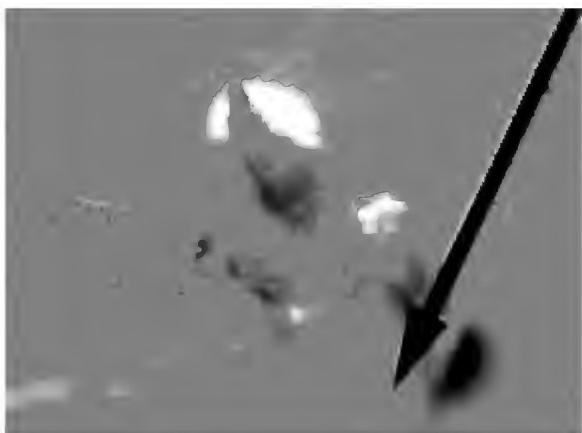
Caudicle bulb type: clear

Translator/caudicle type: fb/o

Pollinia end type: T.....(tapered inward).

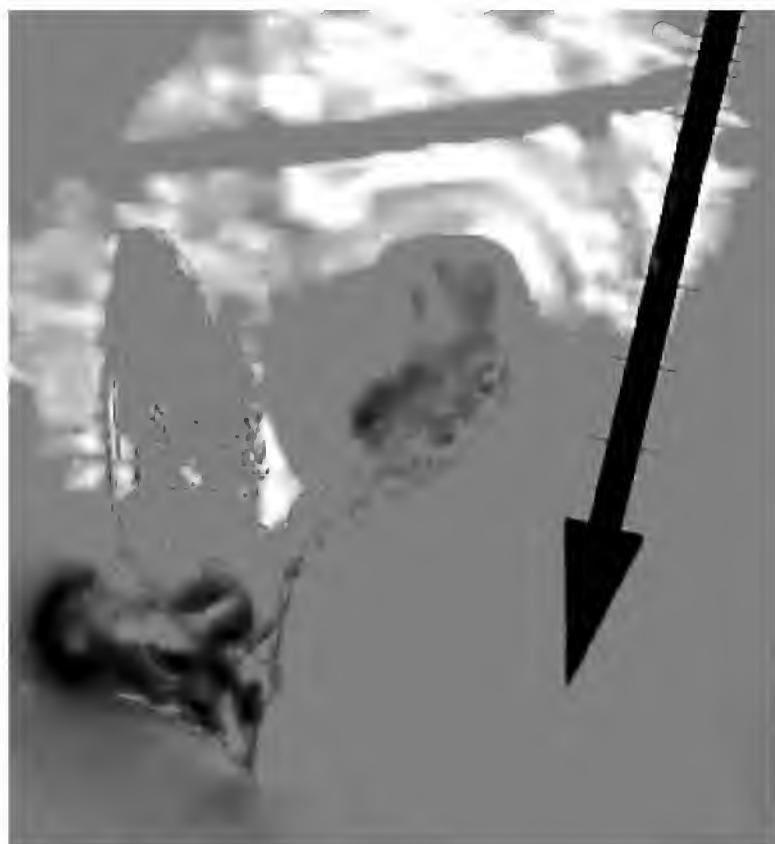
Caudicle bulb: C

Retinacula character: R



Pollinarium enlarged ca. 110x,
very small and difficult to extract and
photograph.

Photo below shows the retinaculum better enlarged ca. 210x.



Pollinium

length	0.23 mm
widest	0.10 mm

Retinaculum

length	0.07 mm
shoulder	0.07 mm
waist	0.03 mm
hip	0.05 mm
ext	0.06 mm
overall length	0.13 mm

Translator

length	0.14 mm
depth	0.03 mm

Caudicle

bulb diam	0.05 mm
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Translator/caudicle

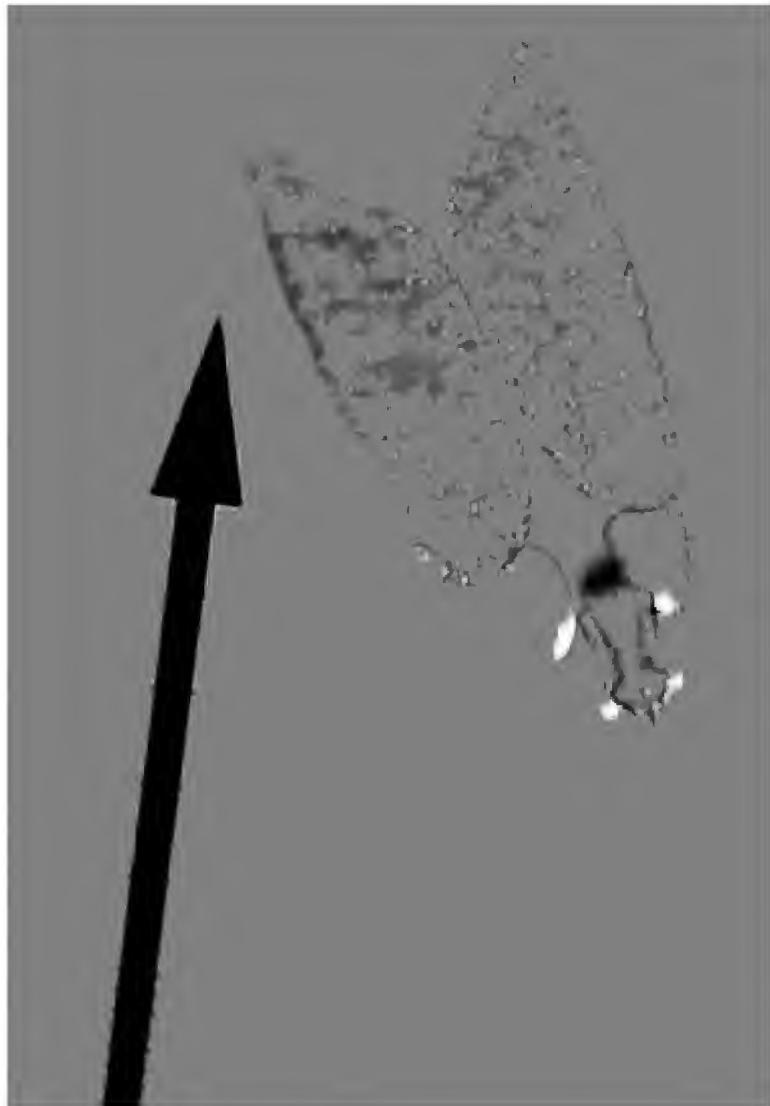
Type: fb/cw

Pollinia inner end type: F

Retinacula character: S

Caudicle bulb: C ?

Hoya taeahwa Kloppenburg & Mendoza
(unpublished) GM #100



Pollinaria enlarged ca.
240x.

Pollinium

length	0.23 mm
widest	0.08 mm

Retinaculum

length	0.07 mm
shoulder	0.04 mm
waist	0.02 mm
hip	0.03 mm
ext.	0.01 mm

Translator

length	0.13 mm
depth	0.02 mm

Caudicle

bulb 0.05 x 0.06 mm

Translator/caudicle type:
fb/cw

Caudicle: C clear

Pollinia inner apex type: T

Retinacula character: LS

***Hoya taeahwa* subsp. *tayuncensis* Kloppenburg & Mendoza
(unpublished) GM #201**



Pollinarium enlarged 190x.

Pollinium

length	0.23 mm
widest	0.12 mm

Retinaculum

length	0.06 mm
shoulder	0.04 mm
waist	0.02 mm
hip	0.04 mm
ext.	0.03 mm

Translator

length	0.13 mm
widest	0.03 mm

Caudicle

top	0.05 mm
deep	0.05 mm
stem	0.02 mm

Type: C

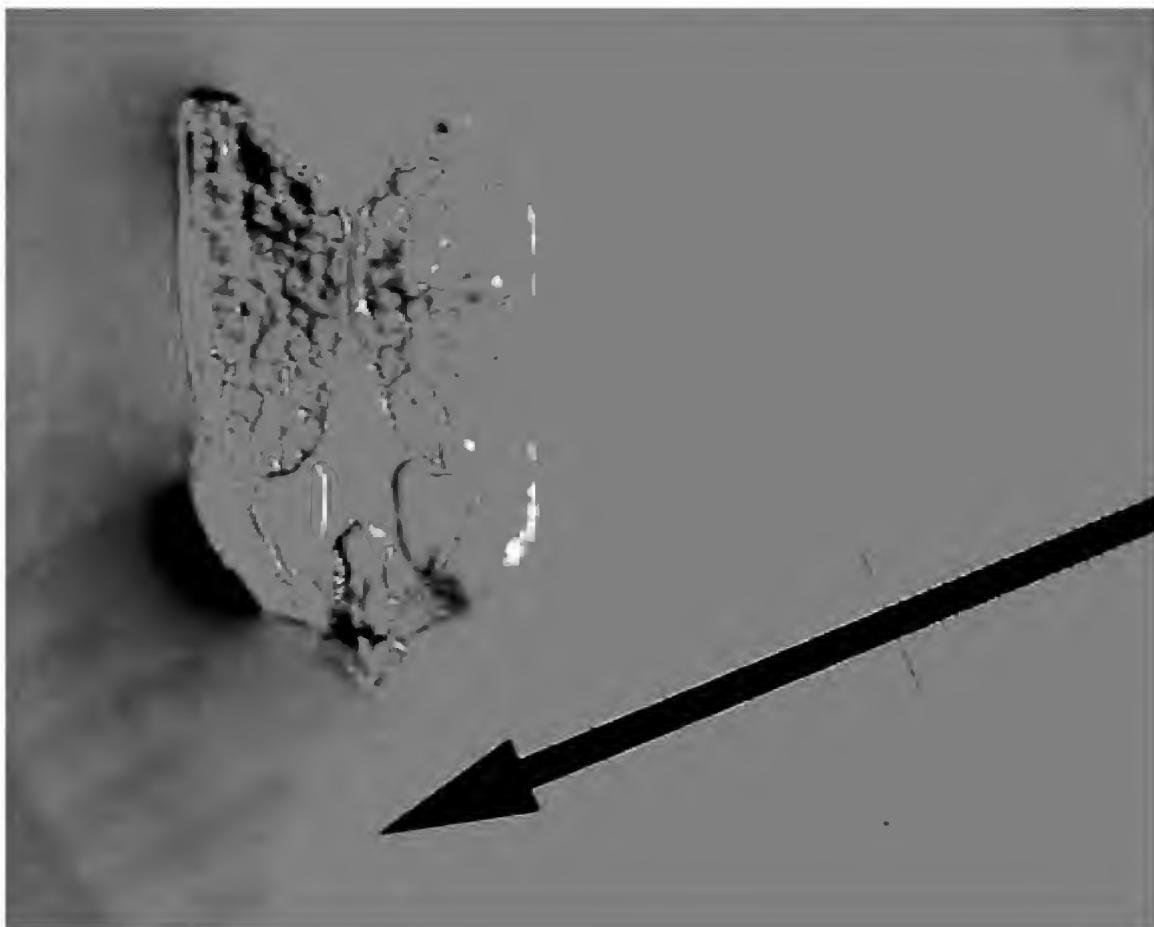
Translator/caudicle type:
fb/cw

Pollinia inner ends: T
(tapered)

Caudicle bulb: C

Retinacula character: R

Hoya nagcarlanensis Kloppenburg, Mendoza
(unpublished) GM #105



Pollinarium enlarged ca. 200x.

Pollinium

length	0.23 mm
widest	0.11 cm

Retinaculum

length	0.07 cm
shoulder	0.04 mm
waist	0.03 mm
hip	0.04 mm
ext.	0.04 mm

Retinacula character: LS

Translator

length	0.14 mm
widest	0.04 mm

Translator/caudicle type: fb/cw

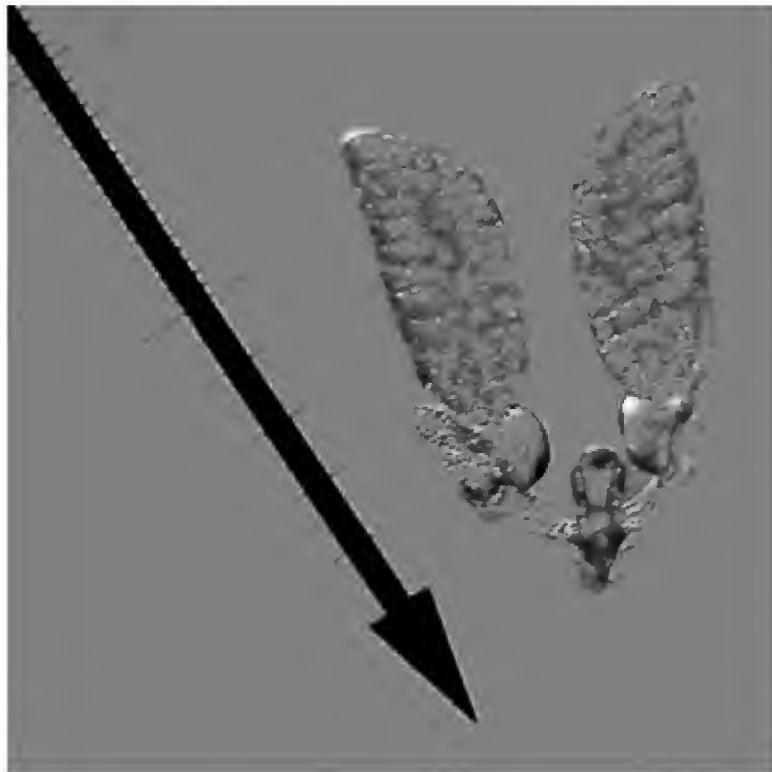
Pollinia apex type: T

Caudicle
bulb

0.05 x 0.06 mm

Caudicle clear

Hoya caespitosa Kloppenburg & Mendoza
(unpublished) GM #51



Pollinaria enlarged ca.
190x.

Pollinarium

length	0.22 mm
widest	0.08 mm

Retinaculum

length	0.08 mm
shoulder	0.04 mm
waist	0.03 mm
hip	0.04 mm
ext.	0.02 mm

Translator

length	0.09 mm
wide	0.02 mm

Caudicle

bulb dorsal	0.05 mm
depth	0.06 mm

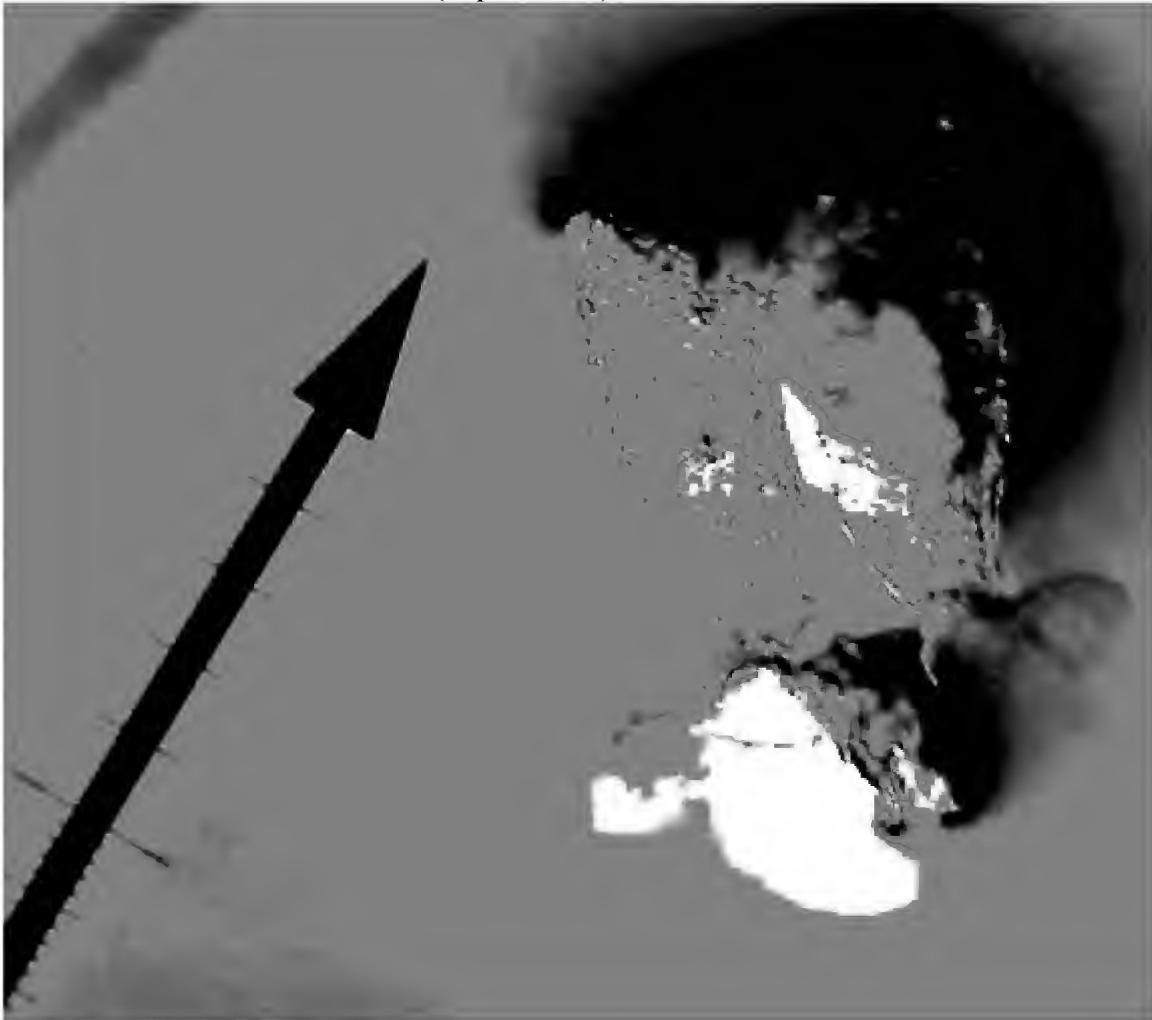
Type: G

Translator/caudicle type: fb/cw

Pollinia end type: T

Retinacula character: LS

Hoya bulba Kloppenburg & Mendoza
(unpublished) GM #82



Pollinarium above enlarged ca. 230x.

Pollinium

length	0.22 mm
widest	0.12 mm

Retinaculum

length	0.07 mm measured always from head to the crotch
shoulder	0.07 mm
waist	0.05 mm
hip	0.06 mm
ext.	0.03 mm

Retinacula character: S

Translator

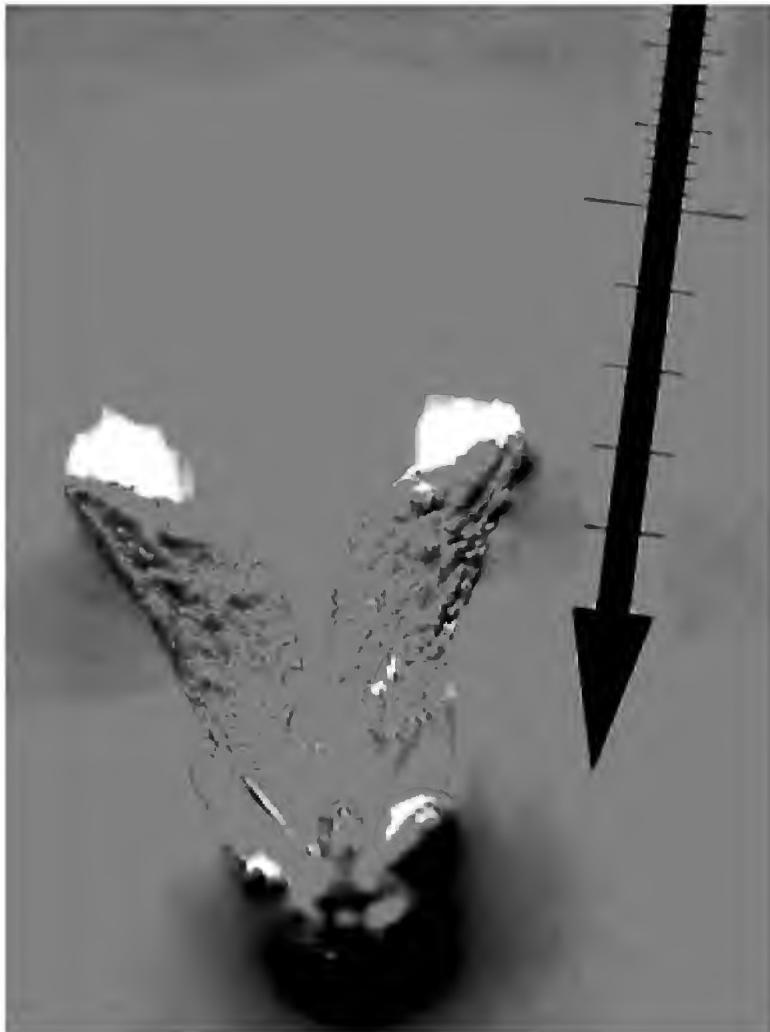
length	0.13 mm
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Caudicle

bulb diam.	0.07 mm
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widest 0.03 mm

Translator/caudicle type: fb/o **Pollinia end type:** RF **Caudicle bulb:** C
Hoya liquida Kloppenburg & Mendoza
(unpublished) GM #96



Pollinaria enlarged ca.
190x.

Pollinium

length	0.22 mm
widest	0.09 mm

Retinaculum

length	0.07 mm
shoulder	0.03 mm
waist	0.02 mm
hip	0.03 mm
ext.	0.03 mm

Translator

length	0.13 mm
widest	0.04 mm

Caudicle

bulb top	0.06 mm
bulb depth	0.07 mm

Type: C

Translator/caudicle Type:
fb/cw.

Pollinia inner end type: T

Caudicle bulb: C

Retinacula character: R

Retinaculum measurement length is from the inner head to the crotch and does not include the lower extensions (the division of the retinaculum proper).

Hoya linguiforma Kloppenburg & Mendoza
(unpublished) GM #103



Pollinaria enlarged ca.
220x.

Pollinium

length	0.22 mm
widest	0.09 mm

Retinaculum

length	0.07 mm
shoulder	0.04 mm
waist	0.03 mm
hip	0.05 mm
ext.	0.04 mm

Translator

length	0.15 mm
widest	0.04 mm

Caudicle

bulb 0.05 x 0.06 mm

Type: C

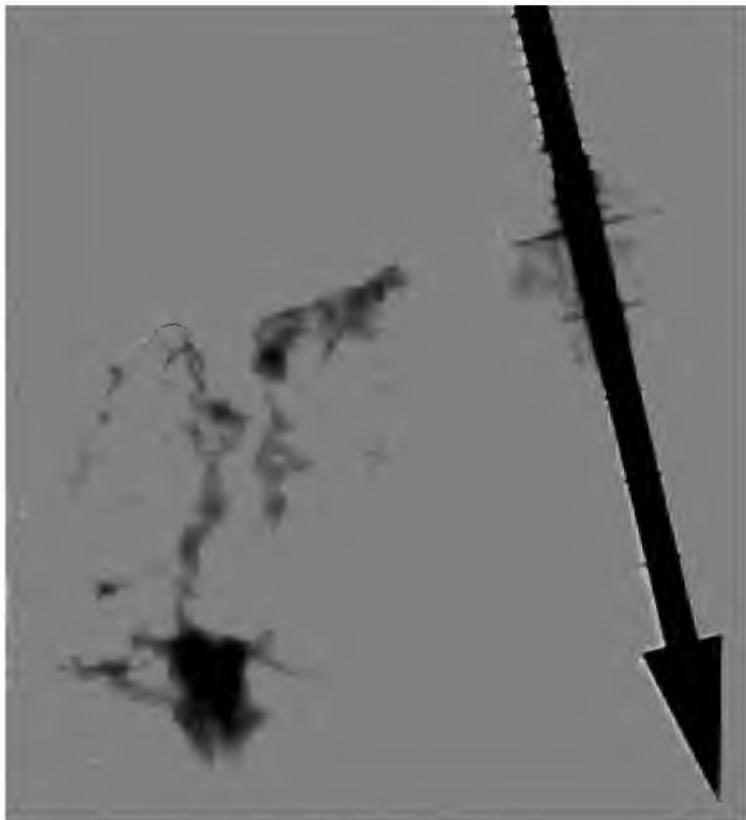
Translator/caudicle type:
fb/cw

Pollinia inner apex type: F

Caudicle bulb: C

Retinacula character: LS

Hoya acanthopenta Kloppenburg & Mendoza
(unpublished) GM #202



Pollinarium enlarged 210x.

Pollinium

length	0.22 mm
widest	0.11 mm

Retinaculum

length	0.07 mm
shoulder	0.07 mm
waist	0.03 mm
hip	0.06 mm
ext.	0.02 mm

Translator

length	0.09 mm
widest	0.06 mm

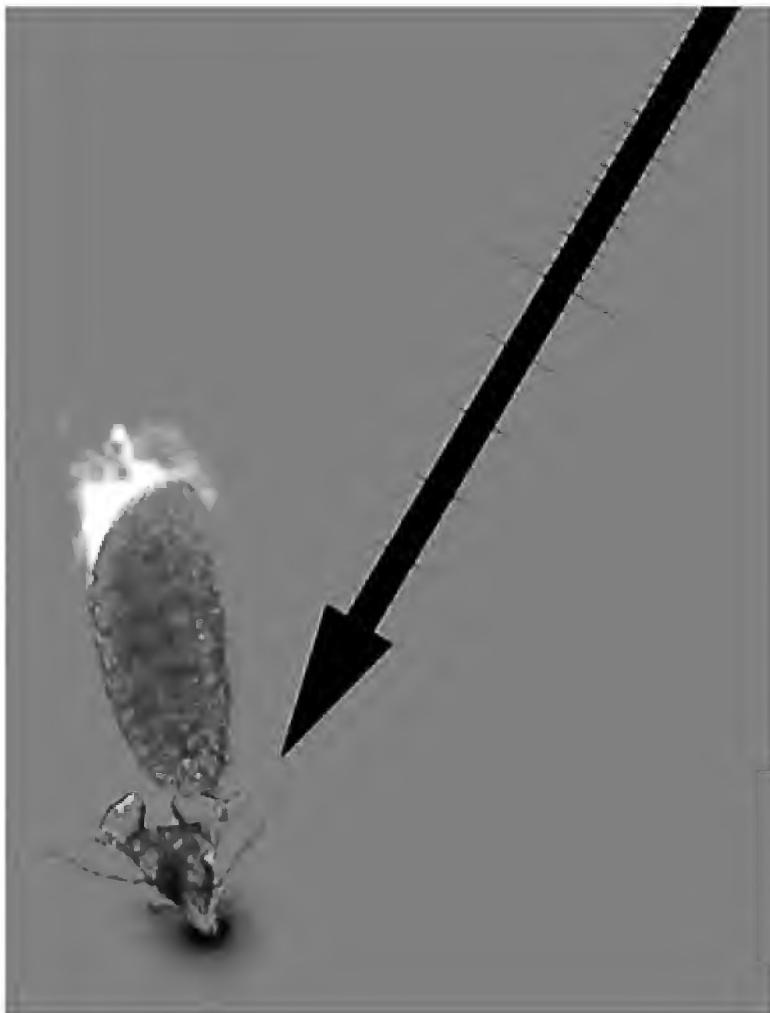
Caudicle 0.06 x 0.04 mm

Translator/caudicle type:
fb/cw.

Pollinia inner apex type: F

Caudicle bulb: ?

Retinacula character: S



Pollinaria enlarged ca.
210x.

Pollinium

length	0.21 mm
widest	0.08 mm

Retinaculum

length	0.05 mm
shoulder	0.07 mm
waist	0.03 mm
hip	0.04 mm
ext.	0.02 mm

Translators

length	0.08 mm
widest	0.02 mm

Caudicle

bulb diam. 0.02 x.03
mm

Translator/caudicle type:
fb/cw

Pollinia inner apex type:
T

Caudicle bulb: C

Retinacula character: S

***Hoya rosarioae* subsp. *realensis* Kloppenburg & Mendoza**
(unpublished) GM #65



Pollinaria
enlarged ca. 220x.

Pollinium

length 0.21 mm
widest 0.10 mm

Retinaculum

length 0.05 mm
shoulder 0.04 mm
waist 0.02 mm
hip 0.03 mm
ext 0.01 mm

Translator

length 0.10 mm
wide 0.03 mm

Caudicle

bulb measurements
0.04 x 0.7mm

Type: clear

Translator/caudicle Type: fb/o

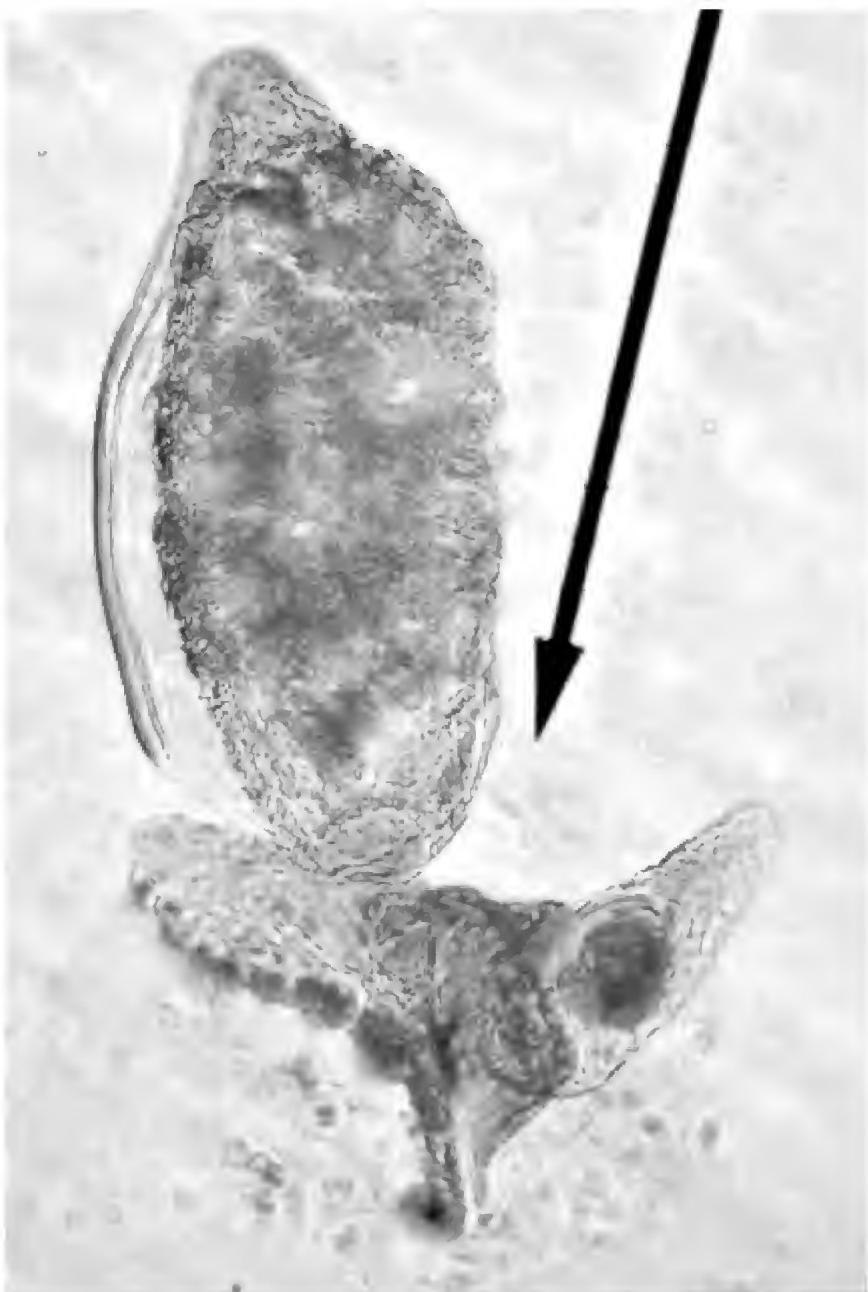
Pollinia inner apex type: T

Retinacula character: S

Hoya sp. Monina #1

Data 17 Dec. 2006, Fresno CA.

Flower cluster and leaves sent via Monina Siar. Pollinarium indicates *H. bilobata*.



Pollinarium
enlarged about
165X.



Here reticle is to scale head is 0.1 mm long.

Pollinium

length	0.21 mm.
widest	0.11 mm.

Retinaculum

length	0.04 mm.
shoulder	0.05 mm.
waist	0.04 mm.
hip	0.05 mm.-
ext.	0.02 mm.-

Translator

length	0.08 mm.
depth	0.02 mm with concave top
widest	0.03 mm.

Caudicle

bulb diam.	0.03 mm.
------------	----------

Ratio: r/p 3.5
w/p 1.9

Hoya leytensis Elmer ex Burton

Hoya sp. IML 228 via Peter Tsang 1979



Pollinarium
enlarged about
165x.

Pollinium
length 0.21 mm
widest 0.10 mm

Retinaculum
length 0.08 mm
shoulder 0.06 mm
waist less
hip 0.05 mm
ext. 0.03 mm

Translators
length 0.10 mm
widest 0.02 mm

Caudicle
bulb diam. 0.03 mm

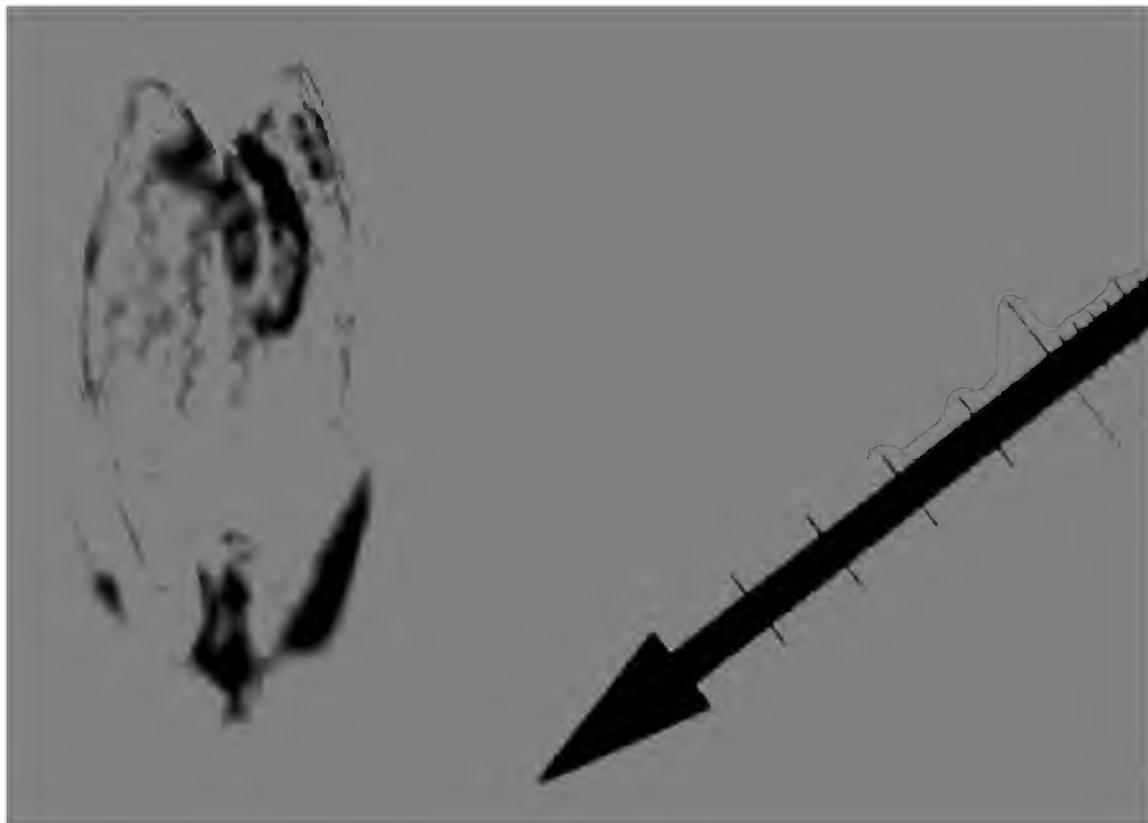
Translator/caudicle type: fb/cw

Pollinia end type: F

Caudicle bulb: C

Retinacula character: R

***Hoya unica* subsp. *bakerensis* Kloppenburg & Mendoza**
(unpublished) GM #155



Pollinium enlarged 240x.

Pollinium

length	0.21 mm
widest	0.07 mm

Translator/caudicle type: lb/o

Pollinia apex type: T

Retinaculum

length	0.07 mm
shoulder	0.03 mm
waist	0.02 mm
hip	0.04 mm
ext.	0.02 mm

Translator

length	0.14 mm
widest	0.03 mm

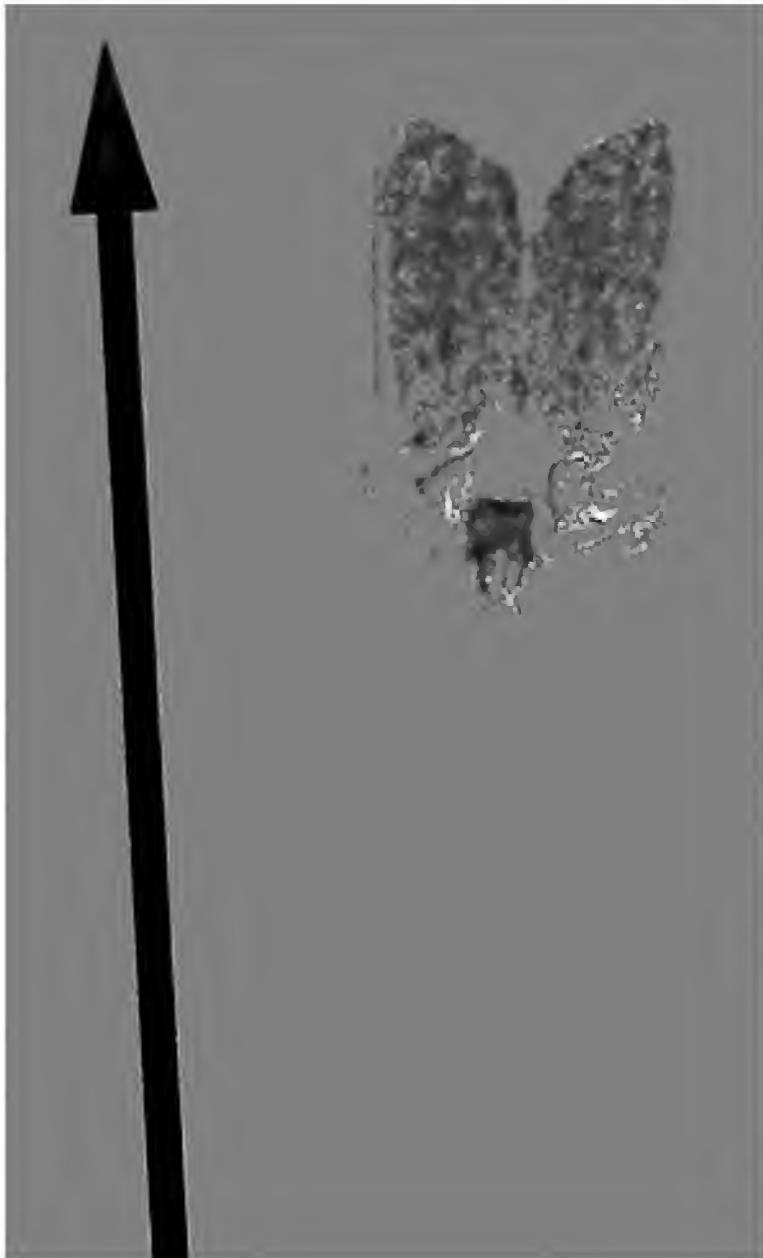
Retinacula character: E

Caudicle

bulb	0.04 x 0.06 mm
------	----------------

Type: C

Hoya pubacupula Kloppenburg Mendoza
(unpublished) GM #25



Pollinaria enlarged ca.
260x.

Pollinium

length	0.20 mm
widest	0.09 mm

Retinaculum

length	0.03 mm
shoulder	0.04 mm
waist	0.03 mm
hip	0.04 mm
ext.	0.03 mm

Translator

length	0.08 mm
wide	0.03 mm

Caudicle

bulb diam.	0.03 mm
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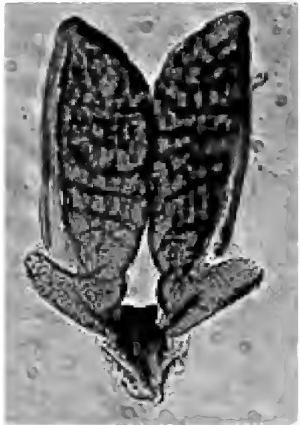
Translator/caudicle type:
fb/cw

Caudicle bulb. G

Pollinia end type: R/T

Hoya picta Miquel 1856

Flower from Ted Green. Kaaawa, Hawaii
Plant cut from Ruurd van Donkelaar, Holland



Pollinia

length	0.20 mm
widest	0.08 mm

Retinaculum

length	0.06 mm
shoulder	0.04 mm
waist	0.02 mm
hip	0.04 mm
ext.	0.02 mm

Translator

length	0.09 mm
depth	0.02 mm

Caudicle

bulb diam.	0.04 mm
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Translator/caudicle type: fb/cw

Pollinia end type: FT

Caudicle bulb: G

Retinacula character: S

Hoya bilobata Schlechter 1908 ?

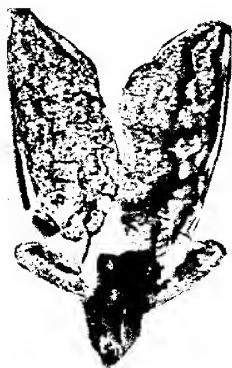
Grown and flowered in Fresno, CA. USA.



	<u>top clone</u>	<u>bottom clone</u>
Pollinium		
length:	0.22 mm	0.19 mm
widest:	0.09 mm	0.08 mm
Retinaculum		
length:	0.07 mm	0.08 mm
shoulder	0.06 mm	0.06 mm
waist:	0.04 mm	0.04 mm
ext.:	0.03 mm	0.03 mm
Translators		
length:	0.08 mm	0.08 mm
depth:	0.03 m.	0.03 mm
Caudicle		
bulb diam:	0.04 mm	0.03 mm

Red edged leaf clone

Magnified approximately 165x.



Translator/caudicle type: fb/cw

Pollinia end type: F

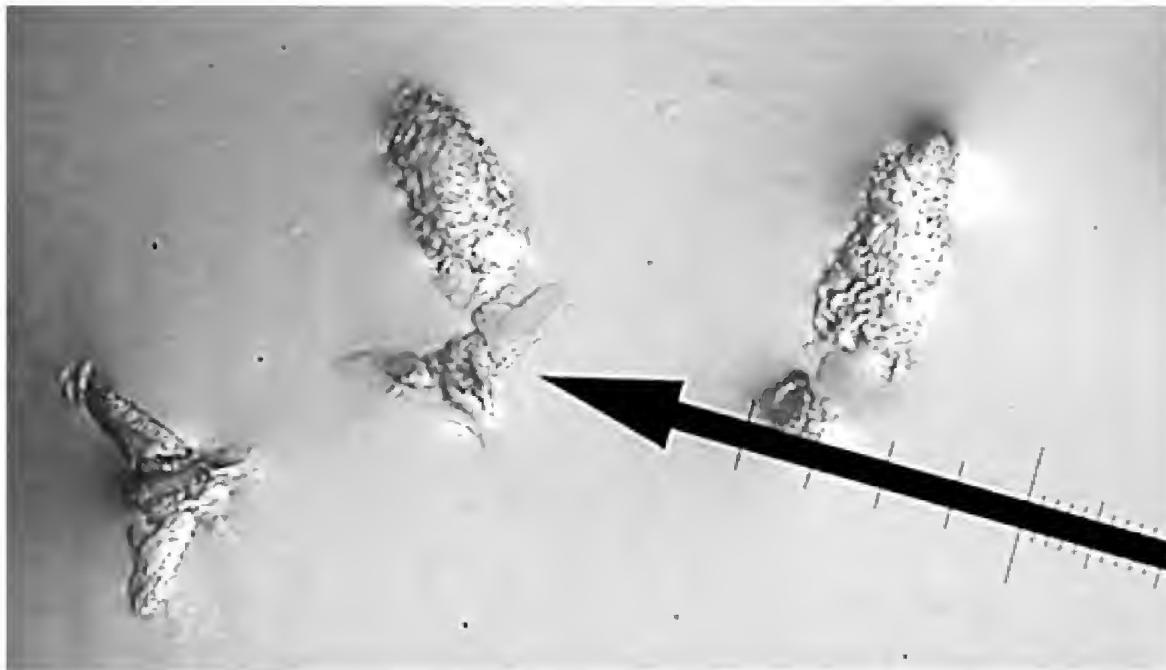
Caudicle bulb: C

Retinacula character: S

Clone IML 228 affinis *H. bilobata* Schltr..

Magnified approximately 165x.

Hoya sp. Monina #2
Data & photos 18 Dec. 2006



Pollinaria enlarged about 165 X. Reticle head is 0.1 mm. faint lines in background are 0.01 mm wide between each line. Above picture with 100X magnification and below with 300X magnification



Pollinium

length 0.19 mm.
widest 0.09 mm.

Retinaculum

length 0.05 mm.
shoulder 0.05 mm.
waist 0.03 mm.
hip 0.04 mm.
ext. 0.03 mm.

Translators

length 0.09 mm.
depth 0.01 mm.
widest 0.03 mm.

Caudicle

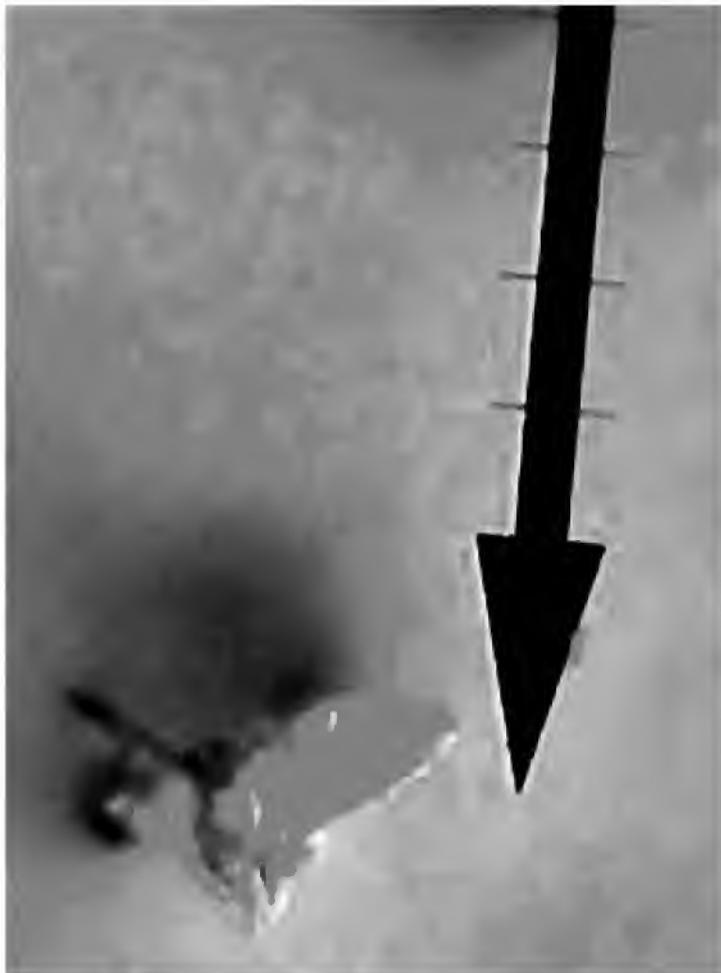
bulb diam. 0.03 mm.

Ratio R/P 2.4

P/w 2.1

Hoya amorosoae T. Green & Kloppenburg 2014

sp. Mindanao, Philippines



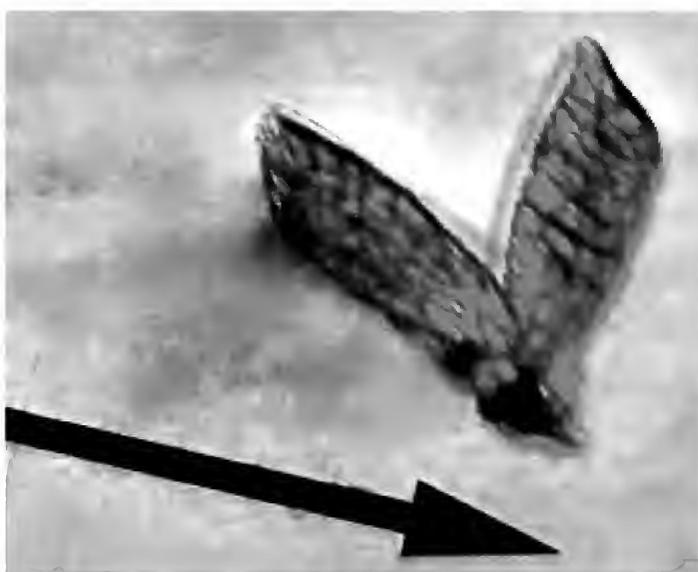
Pollinarium photo enlarged
301x.

Retinaculum

length	0.05 mm
shoulder	0.05 mm
waist	0.04 mm
hip	0.05 mm
ext.	0.03 mm

Translators

length	0.08 mm
widest	0.04 mm



Pollinarium enlarged 200x.

Pollinia

length	0.20 mm
widest	0.09 mm

Translator/caudicle type: fb/cw

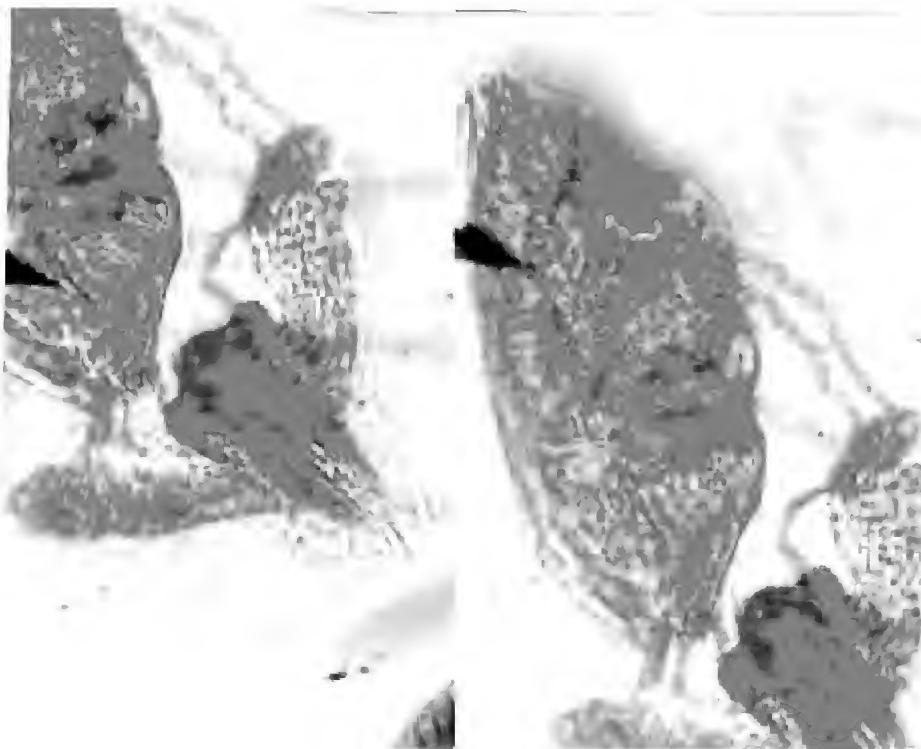
Pollinia ends: F

Caudicle bulb: ?

Retinacula character: S ?

Hoya sp. DS #1

Most likely *Hoya bilobata* Schlechter.



Pollinium

length	0.19 mm
widest	0.08 mm

Retinaculum

length	0.05 mm
shoulder	0.05 mm
waist	0.03 mm
hip	0.04 mm
ext.	0.03 mm

Translator

length	0.08 mm
depth	0.01 mm
width	0.03 mm

Caudicle

bulb diam	0.4 mm
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Translator/caudicle type: fb/cw

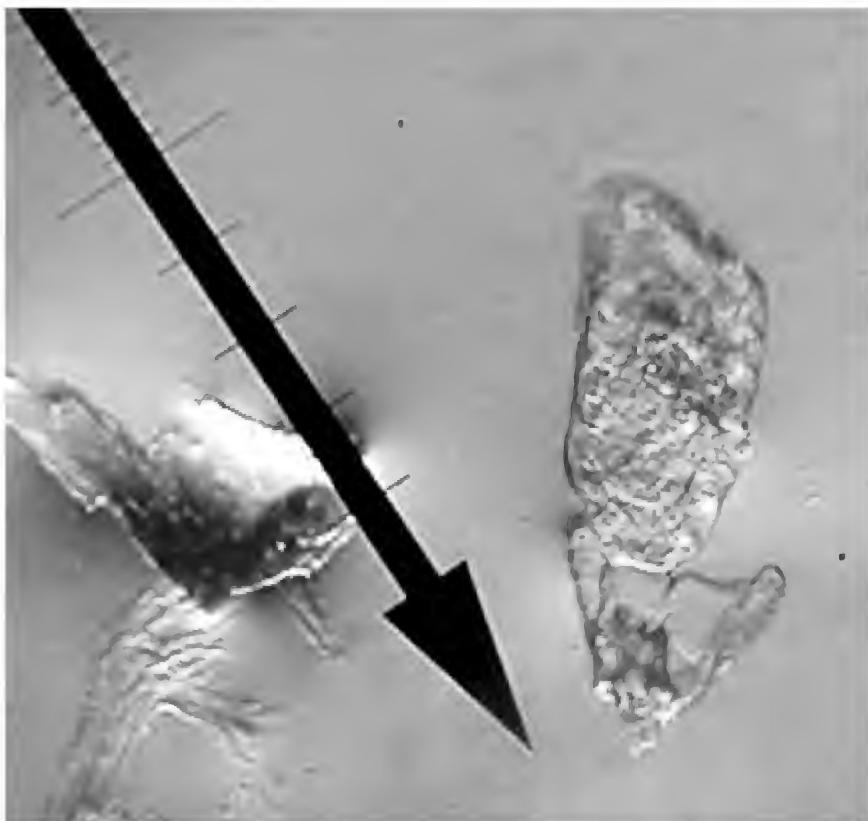
Pollinia ends: F

Caudicle bulb: G

Retinacula character: S

Hoya brittonii Kloppenburg, 1992

Type: Britton #19519, PNH Badoc, Calapan, Mindoro Creek, Mindoro, Philippines



Pollinaria with one pollinium missing enlarged about 80X.

Pollinium

length	0.19 mm
widest	0.09 mm

Translators

length	0.09 mm
wide	0.01 mm

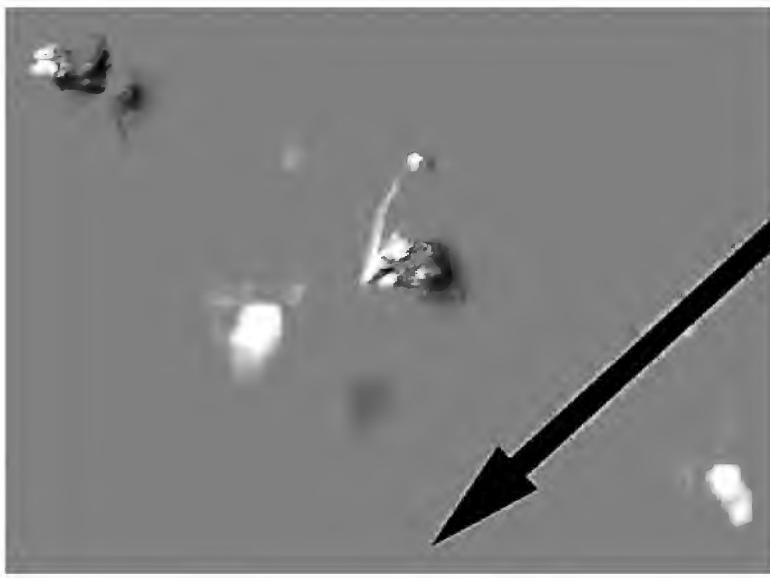
Retinaculum

length	0.05 mm
shoulder	0.04 mm
waist	0.03 mm
hip	0.04 mm
ext	0.01 mm

Caudicle

bulb diam.	0.03 mm
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***Hoya minimapollinaria* Kloppenburg & Mendoza**



Pollinaria enlarged ca. 150x. This is among the smallest of hoya pollinaria and difficult to remove and photograph.

Pollinium

length	0.15 mm
widest	0.06 mm

Retinaculum

length	0.06 mm
shoulder	0.07 mm
waist	0.03 mm
hip	0.05 mm
ext.	0.03 mm

Translator

length	0.12 mm
widest	0.03 mm

This is the shortest pollinaria I have worked with.
not pictured above.

Caudicle most likely cw

Retinacula: S

Translator/caudicle Type: lb/cw

Hoya reyesii Medina & Kloppenburg 2016



Retinaculum

Length - 0.5 um (0.05mm)
Shoulder - 0.3 um (0.03mm)
Waist - 0.2um (0.02mm)
Hip - 0.3um (0.03mm)
Extension - 0.2um (0.02mm)

Pollinia

Length - 0.15 mm
Width - 0.05 mm

Pollinia ends somewhat boat-shaped
(flattened) Type” T (tapered)

Translator/caudicle type: - unclear (but
fb/cw type)

Caudicle: clear “C”

Retinacula type: HU

Pollinia inner end type: R

Pollinia Types 2018

p/o

1. **Hoya pruinosa** Miquel 1856
2. **Hoya obtusifolia** Wight 1834
3. **Hoya sp. UC #18041 odorata**
4. **Hoya mitrata** Kerr 1940
5. **Hoya meliflua** subsp. *nuevaensis* Kloppenburg & Mendoza
6. **Hoya pubicorolla** subsp. *anthracina* Kloppenburg
7. **Hoya meliflua** subsp. *darastanensis* Kloppenburg & Mendoza
8. **Hoya meliflua** subsp. *mendozae* Kloppenburg
9. **Hoya sabaensis** Kloppenburg 2017 (sp. PNH 24031)
10. **Hoya georgemendozae** Kloppenburg
11. **Hoya odorata** Schlechter 1906 (UC 29638 Polillo)
12. **Hoya patameaensis** Kloppenburg 2017
13. **Hoya purpureofusca** Hooker f. 1849
14. **Hoya tamdaoensis** Rodda & T. B. Tran 2015
15. **Hoya leucorrhoda** Schlechter 1913
16. **Hoya sp.** new acuta T.G.
17. **Hoya rigida** Kerr 1939
18. **Hoya limoniaca** S. Moore 1921
19. **Hoya wibergiae** subsp. *alba* Kloppenburg 2015
20. **Hoya sp 80-03**
21. **Hoya estrellaensis** T. Green & Kloppenburg 2012
22. **Hoya nagtabonensis** sp. nov
23. **Hoya sp.** Bostrom
24. **Hoya benguetensis** Schlechter 1906
25. **Hoya bicolor** Kloppenburg 2000
26. **Hoya crassicaulis** Elmer ex Kloppenburg 1995
27. **Hoya sp.** Nagtabon, Palawan 1995
28. **Hoya finlaysonii** Wight 1834
29. **Hoya amoena** subsp. *bogorensis* Green & Kloppenburg 2014
30. **Hoya siniloanensis** Kloppenburg, Guevarra & Carandang
31. **Hoya calyxminuta** Kloppenburg
32. **Hoya tauensis** Kloppenburg 2011 (Type 1297 HAW)
33. **Hoya litii** Kloppenburg, Siar & Cajano 2016 (Type 72240 CAHUP)
34. **Hoya sp.** 900129
35. **Hoya sp.** Edano (PNH) 14203 1951
36. **Hoya sp.** CAHUP 3935, Hernaez 2 March 1990
37. **Hoya marlowii** Kloppenburg & Mendoza
38. **Hoya clemensiorum** Green 2001
39. **Hoya sp.** Long Miau #1405 8/25/00
40. **Hoya marlowii** Kloppenburg & Mendoza
41. **Hoya lavacensis** Kloppenburg, Guevarra & Carandang
42. **Hoya ilagorum** Kloppenburg & Siar 2011

43. ***Hoya marlowii* subsp. *polilloensis*** Kloppenburg & Mendoza
44. ***Hoya lucbanensis* subsp. *papillata*** Kloppenburg & Mendoza
45. ***Hoya lucbanensis*** Kloppenburg & Mendoza
46. ***Hoya velasioii*** Kloppenburg 2015
47. ***Hoya blashernaezii* subsp. *recurvula*** Kloppenburg & Cajano
48. ***Hoya blashernaezii* subsp. *grandiora*** Kloppenburg & Mendoza
49. ***Hoya odorata*** Schlechter 1906 (***Hoya paziae***)
50. ***Hoya querinoensis*** Kloppenburg & Siar 2007
51. ***Hoya blashernaezii* subsp. *aurantiaca*** Kloppenburg & Mendoza
52. ***Hoya columna*** Kloppenburg 2014
53. ***Hoya* sp.** CAHUP 63826
54. ***Hoya* sp.** CAHUP 41945
55. ***Hoya* sp. NS 005**
56. ***Hoya bebsguevarrae*** Kloppenburg & Carandang 2013
57. ***Hoya bicolensis*** Kloppenburg, Siar & Cajano 2013
58. ***Hoya nyhuusiae*** Kloppenburg 2003
59. ***Hoya subrosea*** Kloppenburg & Mendoza
60. ***Hoya pinnata*** Kloppenburg & Mendoza
61. ***Hoya trista*** Kloppenburg & Mendoza
62. ***Hoya unruhiana* subsp. *maubanensis*** Kloppenburg & Mendoza
63. ***Hoya unruhiana*** Kloppenburg, Siar, Mendoza, Cajano & Carandang 2013

Hoya pruinosa Miquel 1856

flower from Ted Green. Syn. *Hoya curtisii* K & G.

Section Acanthostemma (BL) Kloppenburg Subsection Angusticarinata Kloppenburg



Pollinium

length: 0.97 mm
widest: 0.28 mm

Retinaculum

length: 0.09 mm
shoulder: 0.09 mm
waist: 0.06 mm
hip: 0.04 mm
ext.: 0.09 mm

Translators

length: 0.20 mm
depth: 0.03 mm

Caudicle

bulb diam.: 0.08 mm

Translator/caudicle type: p/cw

Pollinia inner end type: R

Caudicle bulb: clear C

Retinacula character:
HE ?

Hoya obtusifolia Wight 1834

Flower from CT, Bangkok Thailand.



Magnified approximately 65x.

Pollinium

length:	0.95 mm
widest:	0.30 mm

Retinaculum

length:	0.30 mm
shoulder:	0.16 mm
waist:	0.05 mm
hip:	0.13 mm
ext.:	0.10 mm

Translators

length:	0.18 mm
depth:	0.05 mm

Caudicle

bulb diam.: ca 0.10 mm

Translator/caudicle type: p/o

Pollinia

inner end type: R

Caudicle bulb: granulate

Retinacula character: HE

Hoya sp. UC #18041

as *Hoya odorata*



Pollinarium enlarged about 165x. Inner pollinium ends rounded, Pellucid edge extends all the way to the base, Retinaculum with long narrow rounded head and nearly the same width all the way down, translators connected well down.

Pollinium

length	0.92 mm
widest	0.29 mm

Retinaculum

length	0.44 mm
widest	0.17 mm
extensions	0.04 mm

Translator/caudicle type: p/o

Pollinia inner end type: R

Caudicle bulb: granulate

Retinacula character: E

This specimen is like (UC) 13176 and maybe (UC) 29638 and (UC) 13860.

Hoya mitrata Kerr 1940

Flower from CT, Thailand.



Pollinia

length	0.90 mm
widest	0.32 mm

Retinaculum

length	0.45 mm
shoulder	0.49 mm
waist	0.29 mm
hip	0.30 mm
extensions	0.25 mm long.

Translators

length	0.19 mm
depth	0.03 mm

Caudicle

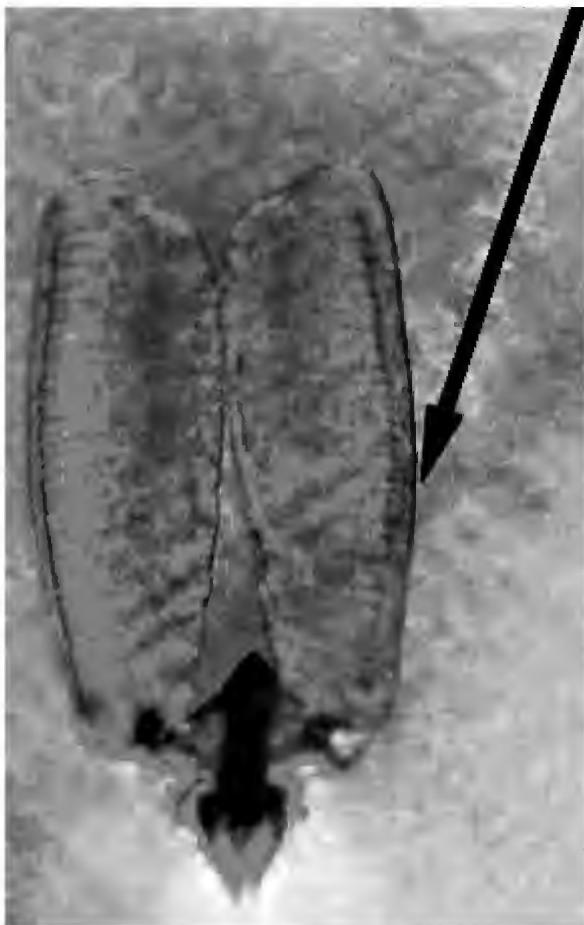
Somewhat linear with small bulbous end. Diameter about 0.07 mm

Translator/caudicle type: p/o

Pollinia inner end type: R

Retinacula character: R

***Hoya meliflua* subsp. *nuevaensis* Kloppenburg & Mendoza
(unpublished)**



Pollinarium enlarged 90x.

Pollinium

length	0.84 mm
widest	0.24 mm

Retinaculum

length	0.23 mm
shoulder	0.22 mm
waist	0.06 mm
hip	0.11 mm
ext	0.05 mm

Translator

length	0.11 mm
widest	0.03 mm

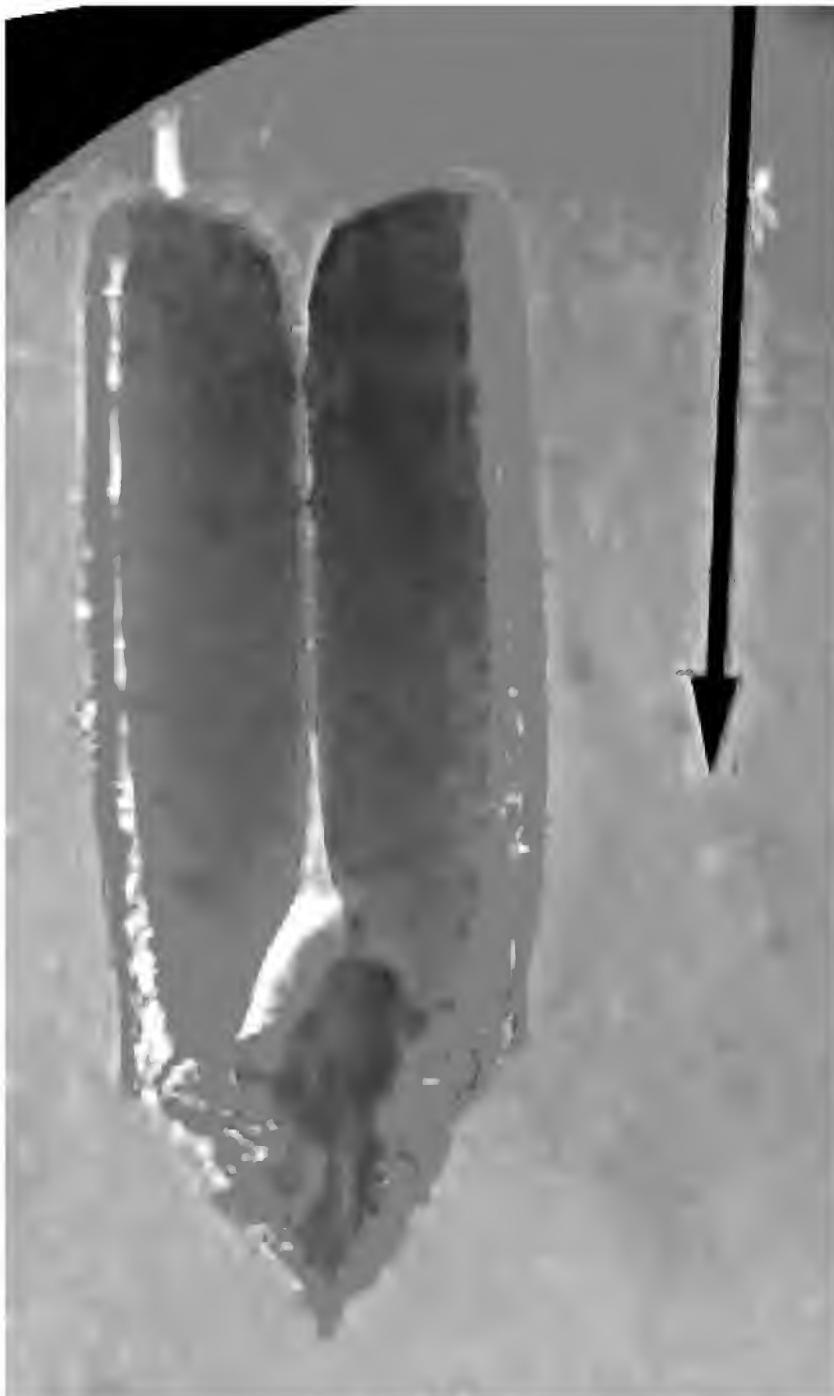
Caudicle

bulb	0.08 mm
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Translator/caudicle type: p/o

Pollinia apex type: T

Retinacula character: S



Pollinaria enlarged
ca. 180x.

Pollinium

length 0.83 mm
widest 0.20 mm

Retinaculum

length 0.26 mm
shoulder 0.20 mm
waist 0.10 mm
hip 0.16 mm
ext. 0.05 mm

Translator

length 0.10 mm
depth 0.03 mm

Caudicle

bulb diam. 0.08 mm

Pollinia inner end
type: R

Translator/Caudicle
Type: d/o

Ratios: p/w 4.2
p/r 5.2

Retinacula: R

Flowers in globose
clusters of ca. 28
flowers.

***Hoya meliflua* subsp. *darastanensis* Kloppenburg & Mendoza**
(unpublished) GM #190



Pollinaria enlarged 120x.

Pollinium

length	0.80 mm
widest	0.25 mm

Retinacula

length	0.21 mm
shoulder	0.26 mm
waist	0.10 mm
hip	0.15 mm
ext.	0.12 mm

Translator

length	0.16 mm
widest	0.09 mm

Caudicle

bulb	0.10 mm
------	---------

Translator/caudicle type: p/o

Pollinia apex type: R

Caudicle bulb: G

Retinacula character: R

Hoya sabaensis Kloppenburg 2017
sp. PNH 24031



Pollinaria enlarged about 165x

Pollinium

length	0.78 mm
widest	0.25 mm

Retinaculum

length	0.14 mm
shoulder	0.13 mm
waist	0.08 mm
hip	0.09 mm
ext.	0.04 mm

Translators

length	0.08 mm
depth	0.02 mm

Caudicle

bulb diam.	0.04 mm
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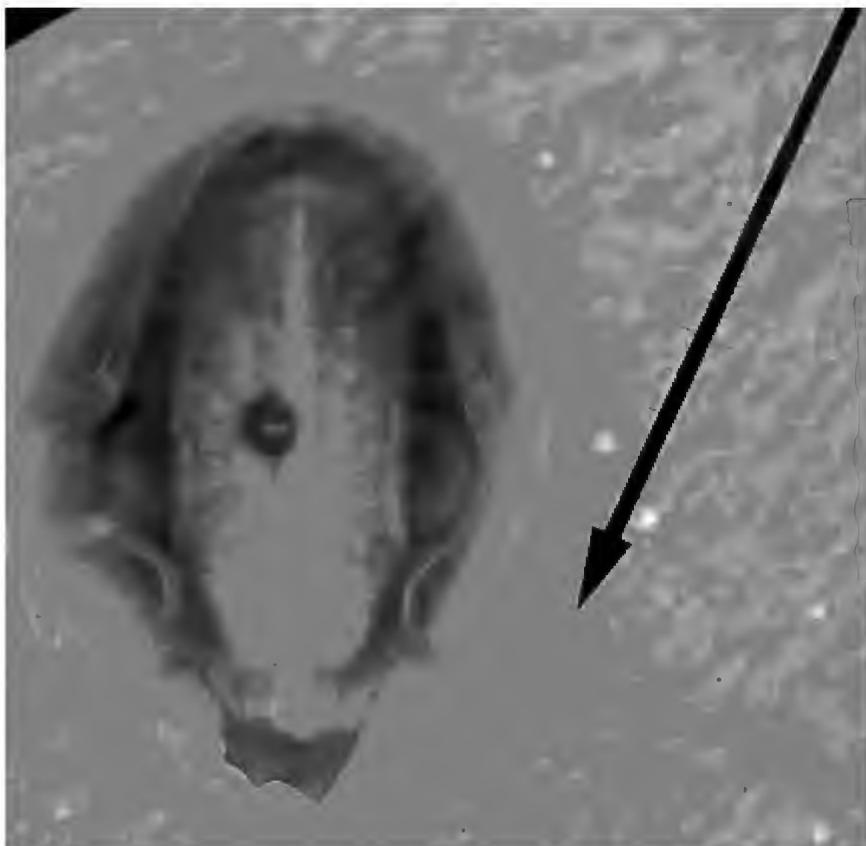
Translator/caudicle type: p/o

Pollinia end type: R

Caudicle bulb: G

Retinacula character: S

***Hoya georgemendozae* Kloppenburg**
(unpublished) GM #1



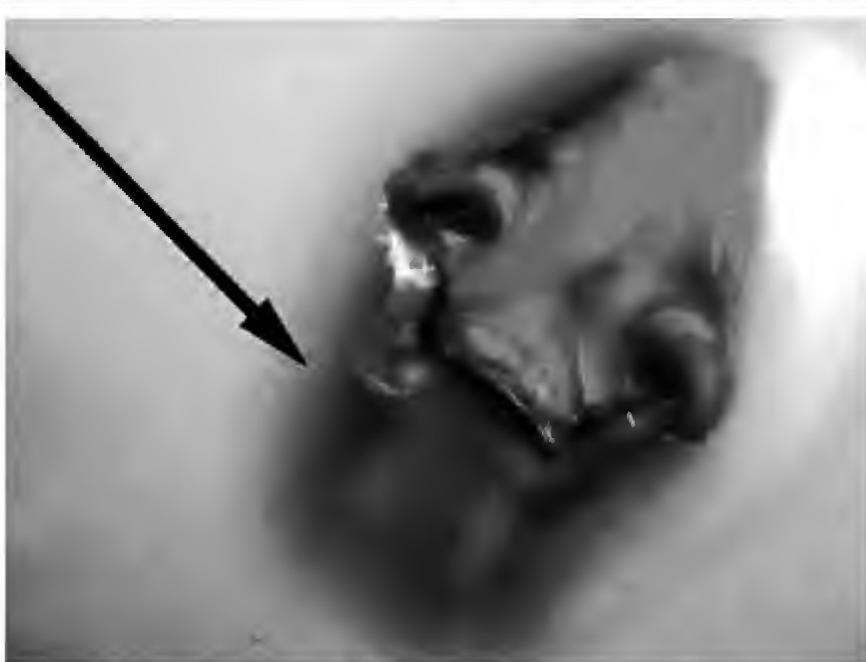
Retinaculum
enlarged ca. 149x.

The pollinia had not
been connected to
the retinaculum by
the translators or
caudicles (flowers
immature?)

The retinacula are
very large.

Retinaculum
length 0.52 mm
widest 0.40 mm
waste 0.25 mm
ext. 0.27 mm

The total length
would be 79 mm.



Bottom view of the
retinaculum: it has
two horn-like
projections at the
widest portion and
below cut off in a
semicircle
configuration.



Pollinium extracted (with difficulty) from the anther pocket. Measurements may not be entirely accurate.

length 0.75 mm
widest 0.32 mm

Note it tapers from a small end to a much broader apex to the top right.

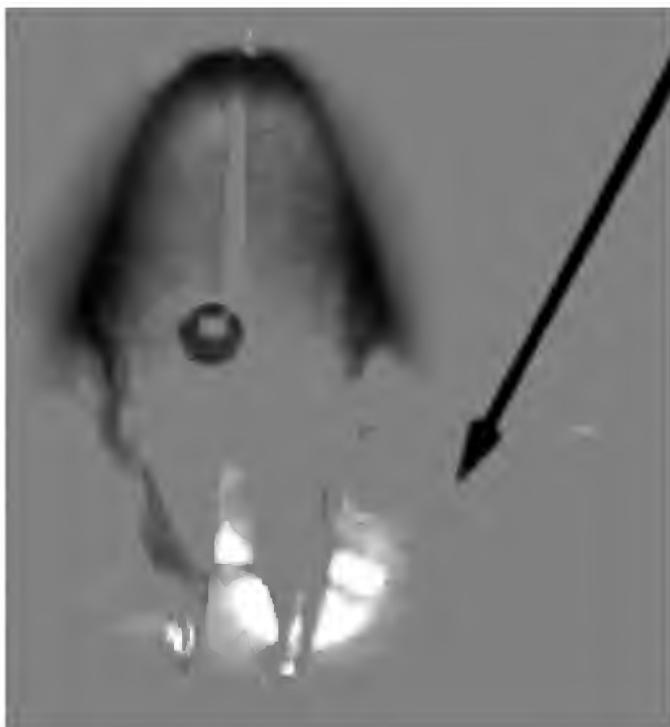
This is close to *Hoya darwinii*
Loher 1910

Translator/caudicle type:
p/o

Pollinia end type: R

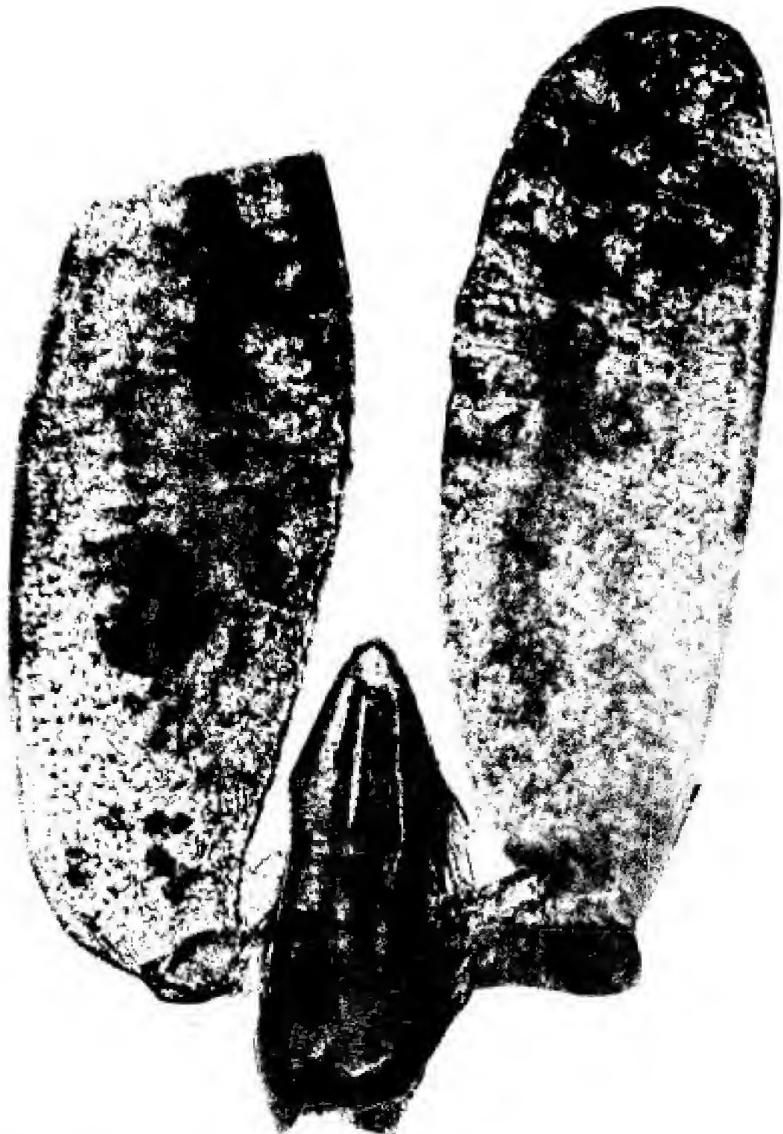
Caudicle Bulb: ?

Retinacula character: R



One more picture of the retinaculum here enlarged ca. 180x.
Very similar to that of *Hoya darwinii* Loher.

Hoya odorata Schlechter 1906
Flower from Salvosa 29638 (UC) 1924, Polillo Is., Philippines



Magnified approximately
165x.

Pollinium length: 0.73 mm; widest: 0.25 mm

Retinaculum length: 0.38 mm; shoulder: 0.15 mm; waist: 0.12 mm.; hip: 0.17 mm;
ext.: 0.02 mm

Translators length: 0.14 m.; depth: 0.05 mm

Caudicle bulb diam.: 0.10 mm

Translator/caudicle type: p/o

Retinacula character: HE

Pollinia inner end type: R

Caudicle bulb: G

Hoya patameaensis Kloppenburg 2017

sp. W 1796

Labeled *H. chlorantha* then determined to be *H. betchei*. It is neither



Retinaculum enlarged about 165x. One translator attached to the left.

length	0.27 mm
shoulders	0.18 mm
waist	0.08 mm
hips	0.14 mm
extensions	0.05 mm

Translator

length	0.15 mm
depth	0.03 mm

Caudicle bulb

diam. 0.03 mm it is somewhat flattened.



Pollinarium enlarged about 165x. A foreign object lays to the left above the dark retinaculum.

Pollinium

length	0.73 mm
widest	0.24 mm

Translator/caudicle type: p/o

Pollinia inner end type: T

Caudicle bulb: G

Retinacula character: S

Hoya chlorantha Reich. 13 March 1974,
det. Feb. 1975 as *Hoya betchei* (Schltr.)
Whistler. Savai'i, Samoa.

***Hoya purpureofusca* Hooker 1849**
Flower from a clone flowered and grown in Fresno, CA. USA.



mm

Pollinium		
length	0.73 mm	
widest	0.25 mm	
Retinaculum		
length	0.30 mm	
shoulder	0.17 mm	
waist	0.07 mm	
hip	0.11 mm	
extensions	0.04 mm	
Translators		
	length	0.20
	depth	0.02 mm
Caudicle		
bulb diam.	?	

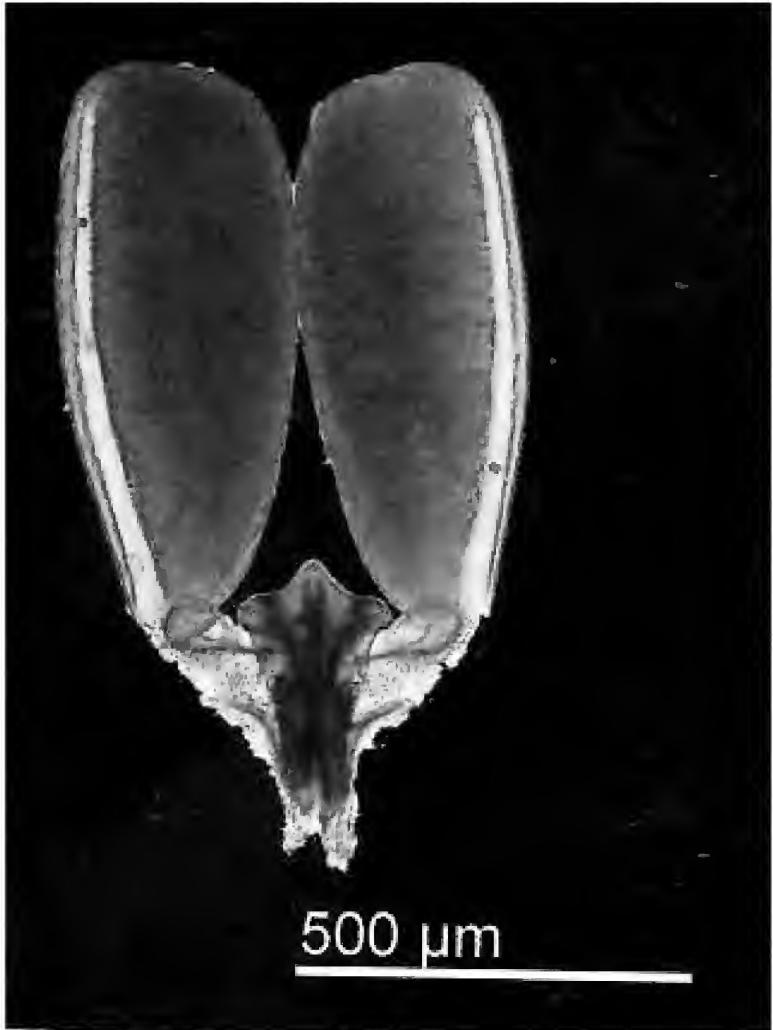
Translator/caudicle type: p/o

Pollinia inner end type: RT

Caudicle bulb: ?

Retinacula character: S

***Hoya tamdaoensis* Rodda & T. B. Tran 2015**



Pollinium

Pollinia

length	0.72 mm
widest	0.26 mm

Retinaculum

length	0.28 mm
shoulder	0.16 mm
waist	0.09 mm
hips	0.12 mm
extensions	0.09 mm

Translators

length	0.12 mm
depth	0.07 mm

Caudicle

bulb diam.	0.06 mm
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Translator/caudicle type:
p/o

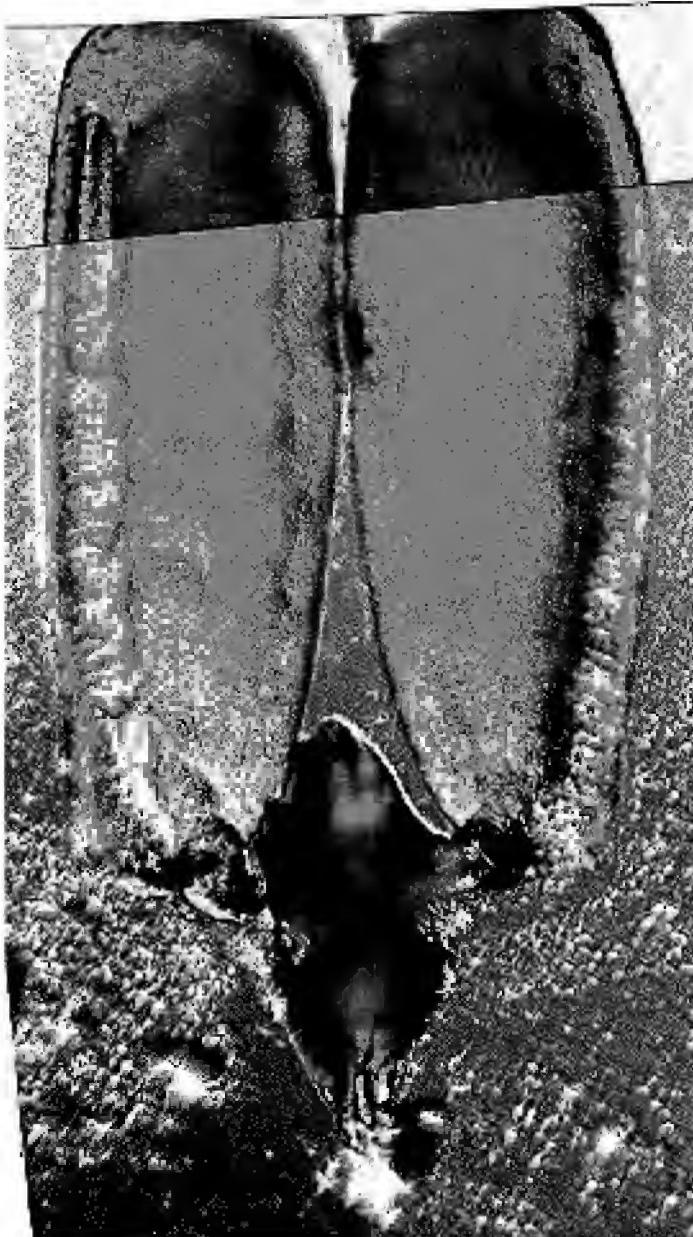
Pollinia inner end type: R

Caudicle bulb: C

Retinacula character: S

Hoya leucorrhoda Schlechter 1913

From Ted Green ABG #85-1515 via Liddle's Australia.



A composite (2) picture of the pollinaria enlarged about 165x. The pollinia are long and the retinaculum is large.

Pollinia

length	0.71 mm
widest	0.25 mm

Retinaculum

length	0.30 mm
shoulder	0.17 mm
hips	0.08 mm
waist	0.14 mm
extensions	0.05 mm

Translators

length	0.09 mm
depth	0.02 mm

Caudicle

bulb diameter 0.05 mm

Translator/caudicle type: p/o

Pollinia inner end type: R

Caudicle bulb: G

Retinacula character: R

Hoya sp. new acuta T.G.

Flowers and cutting sent in June 2004 by Ted Green with a unusual nerved leaf, ca. 25 flowers in a cluster. Photographed Monday 21 June 2004.

Pollinaria: There appears to be two distinct pollinaria in this group of species. Those from Malaya have retinacula with a distinct Shoulder that is upswept and curved back toward the stylar table whereas those from Thailand have shoulders that appear not to be swept back and there is very little distinctness in the waist or hip area. This one does not have well developed extensions and I measured what is distinct but barely differentiated tissue.



Pollinia

length 0.65 mm
widest 0.23 mm

Retinaculum

length 0.22 mm
shoulder 0.11 mm
waist 0.09 mm
hip 0.10 mm
ext. 0.05 mm

Translators

length 0.13 mm
depth 0.04 mm

Caudicle

bulb diam. 0.09 mm

Translator/caudicle

type: p/o

Pollinia inner end
type: T

Caudicle bulb: G

Hoya rigida Kerr 1939

Flowers (in Alcohol) sent me by Chanin Thorut from Bangkok, Thailand 3/12/92.



The pollinarium enlarged about 165x. The apices of the pollinia are slightly truncate or squared off. There is a strong pellucid border with a rather uniformed width to the vacuole, the pollinia are long. The translators are narrow and rather short and the caudicles are not well defined. The retinaculum has a winged head and also winged at the hip and tapers to the outer apex from this area.

One more view of the pollinarium at a slightly different focal length enlarged again about 165x. I wanted you to see the distinctive wings or curls on each side of the head and again duplicated at the hip area. They show up better on the original photo.

Pollinia

length	0.65 mm
widest	0.24 mm

Retinaculum

length	0.22 mm
shoulder	0.12 mm
waist	0.09 mm
hip	0.12 mm
extensions	0.03 mm

Translators

length	0.10 mm
depth	0.02 mm

Caudicle

bulb diam.	0.07 mm
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Translator/caudicle type: p/o

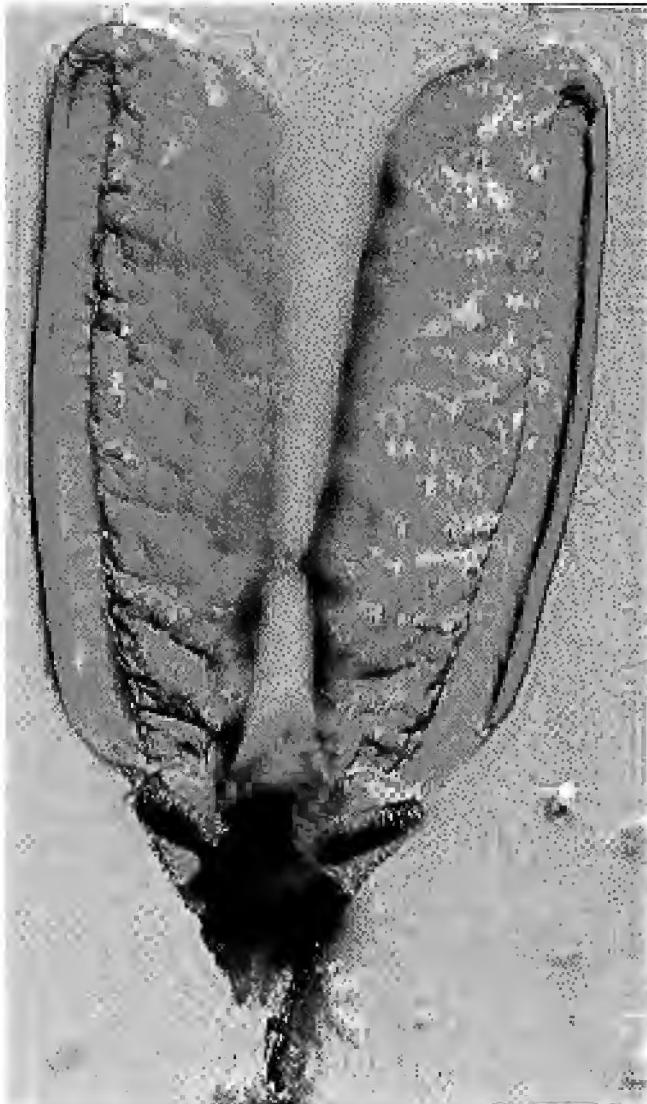
Pollinia inner end type: T

Caudicle bulb: ?

Retinacula character: S

Hoya limoniaca S. Moore 1921

Flower via Ann Wayman, Central Point, OR. USA.



The pollinarium enlarged approx. 165 times. The pollinia have a well defined sterile edge with a large vacuole just in front of it. Note the upper and lower extremes of the sterile edge. The lower end seems to end well above the inner apex. The translators are very unusual with what appears to be rounded projections from the waist area of the retinaculum supporting the clear small caudicles. Since the translators are normally a wedge shape it may be that the upper edge of this structure is here rolled over. The retinaculum is very broad at the hip area.

Pollinium

length	0.62 mm
widest	0.19 mm

Retinaculum

length	0.22 mm
head	0.10 mm
waist	0.07 mm
hip	0.08 mm
Vacuole	ca. 0.03 mm

Translator

(external) 0.10 mm

Caudicle

0.03 mm diam.

Translator/caudicle type: p/o

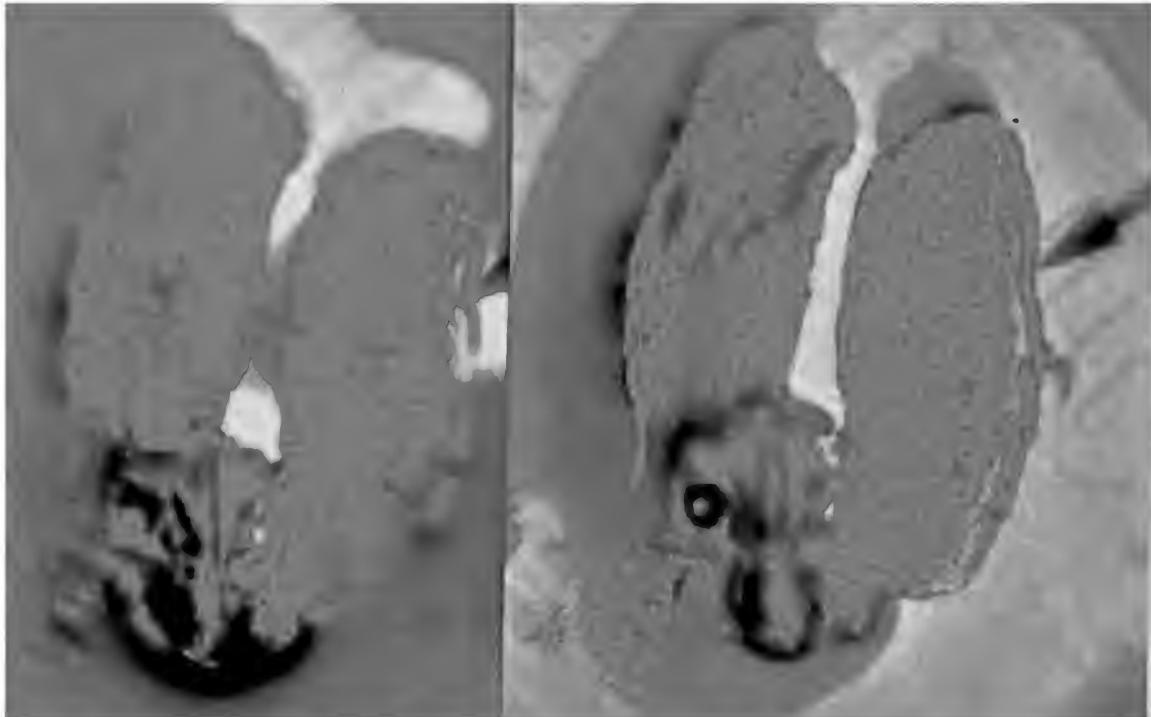
Pollinia apex type: T

Caudicle bulb: G

Retinacula character: S

Hoya wibergiae subsp. alba Kloppenburg 2015
PNH 14203

Collected by G. E. Edano Victoria Mts. Palawan 18 March 1951 growing in moss labeled *H. gracilis* Schlechter incorrectly, it is not in the Section Acanthostemma (Bl.) Klopp. White flower 600m elevation. This appears to be ***Hoya wibergiae*** Kloppenborg. Roll 137 Drawing 245.



Pollinaria enlarged about 85x. **Pollinium:** length 0.60 mm widest 0.25 mm

Retinaculum: length 0.25 mm shoulder 0.10 mm; waist 0.03 mm; hip 0.06 mm ext. 0.01 mm

Translator: length 0.07 mm depth 0.02 mm Caudicle bulb diam. 0.04 mm

Translator/caudicle type: p/o

Pollinia inner end type: RT

Retinacula character: S

Retinacula type: 2S

***Hoya* sp. 80-03**



Pollinarium enlarged about 84X.

Pollinia

length	0.60 mm
widest	0.20 mm

Retinaculum

length	0.25 mm without extension.
shoulder	0.12 mm
waist	0.05 mm
hip	0.07 mm
extensions	0.03 mm ca.

Translator

length	0.10 mm ca.
deepest	0.05 mm

Caudicle

bulb diam. 0.06 mm

Pollinia inner ends: R

Translator type: p/o

Retinacula: LH



I wanted to show the reader that at different focal planes different features are revealed. The same magnification above. The differences usually appear in the retinaculum since it is a relatively thick structure with many structural complexities. Note the differences in what the head of the retinaculum reveals at these different focal planes. Also how the bulbous ends of the caudicle appear to be structurally different. The pollen grains are fine grained in this species.

Hoya estrellaensis T. Green & Kloppenburg 2012



Pollinarium enlarged about 165x.

Pollinium

length 0.57 mm
widest 0.21 mm

Translator

length 0.11 mm
depth 0.07 mm

Retinaculum

length 0.22 mm
shoulder 0.11 mm
waist 0.09 mm
hip 0.03 mm
ext. 0.07 mm

Caudicle

bulb diam. 0.07 mm

Translator/caudicle type: p/o

Pollinia inner end type: RT

Retinacula type: E

Caudicle: G ?

Hoya nagtabonensis sp. nov.

Collected at Nagtabon, Palawan, Philippines.
Yellow colored flower.



Pollinaria enlarged about 165x.

Pollinium

length	0.56 mm
widest	0.19 mm

Retinaculum

length	0.22 mm
shoulder	0.08 mm
waist	0.06 mm
hip-1	0.10 mm
hip-2	0.08 mm
ext.	0.02 mm

Translators

length	0.10 mm
depth	0.04 mm
width top	0.02 mm

Caudicle

bulb diam.	0.05 mm
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Translator/caudicle type: p/o

Pollinia inner end type: RT

Retinacula type: E

Caudicle: G

Hoya sp. flowered by Astrid Boström via Torill Nyuus, Sweden

Specimen collected in Buluson, Philippines



Pollinaria enlarged about 165X.
The pollinia are long and relatively narrow
with rounder inner apices. The pellucid
edge extends over this edge. The
retinaculum is minute with short
translators and small caudicles. The
extensions are flared and not well
developed.

Pollinium

length	0.55 mm
widest	0.19 mm

Retinaculum

length	0.15 mm
shoulders	0.10 mm
waist	0.05 mm
hip	0.07 mm
ext.	0.04 mm

Translators

length	0.09 mm
width	0.02 mm

Caudicle bulb diam. 0.05 mm

Type:C

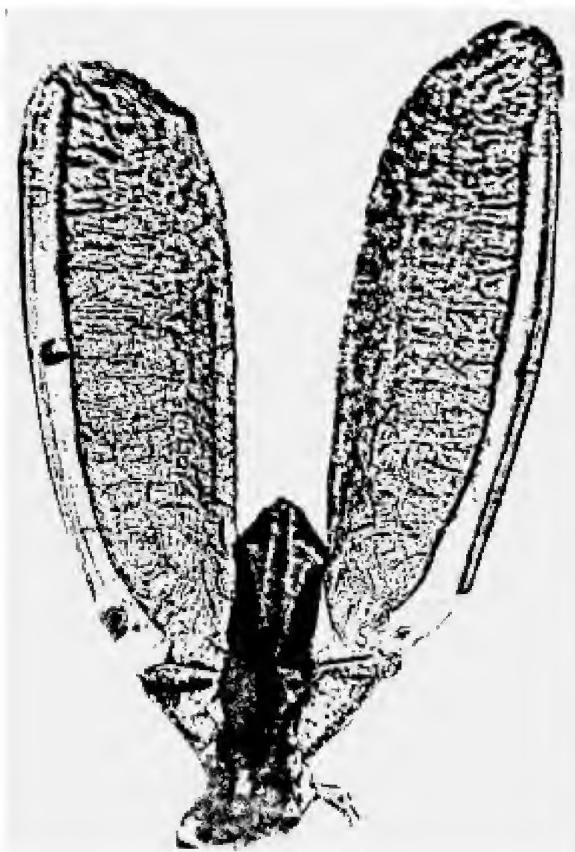
Translator type: p/o

Pollinia inner ends: R

Retinacula: S

Hoya benguetensis Schlechter 1906

(UC) 14997 Loher, 15 May 1909 ?
Rizal, Luzon, Philippines.



Magnified approximately 165x.

Pollinium

length:	0.54 mm
widest:	0.18 mm

Retinaculum

length:	0.23 mm
shoulder:	0.08 mm
waist:	0.06 mm
hip:	0.07 mm
ext.:	0.05 mm

Translators

length:	0.10 mm
depth:	0.03 mm

Caudicle

bulb. diam.: 0.07 mm

Type: G

Translator/caudicle type: p/o

Pollinia apex type: RT

Caudicle bulb: G

Retinacula character: E

Hoya bicolor Kloppenburg 2000



Pollinarium enlarged about 165x.

Pollinia

length	0.54 mm
widest	0.15 mm

Retinaculum

length	0.25 mm
shoulder	0.07 mm
waist	0.06 mm
hips	0.07 mm
extensions	0.05 mm

Translator

length	0.14 mm
depth	0.02 mm

Caudicle

bulb diameter 0.07 mm

Translator/caudicle type: p/o

Pollinia apex type: T

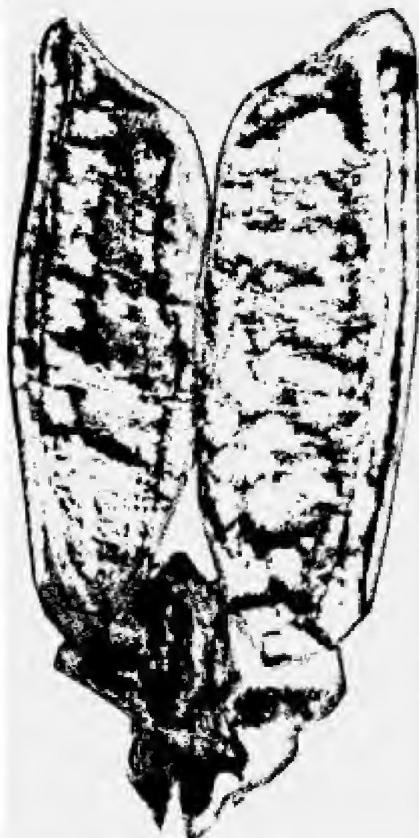
Caudicle bulb: C

Retinacula character: E/LS

Hoya crassicaulis Elmer ex Kloppenburg 1995

Flowered in Fresno, CA. from clone #89053 DH.

Magnified approximately 165x.



Pollinium

length:	0.53 mm
widest:	0.15 mm

Retinaculum

length:	0.19 mm
shoulder:	0.08 mm
waist:	0.06 mm
hip:	0.09 mm
ext.:	0.05 mm

Translators

length:	0.19 mm
depth:	0.02 mm

Caudicle

bulb diam.:	0.05 mm
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Translator/caudicle type: p/o

Pollinia apex type: T

Caudicle bulb: ?

Retinacula character: S

Hoya sp. Nagtabon, Palawan 1995

Flower in Vitro, Yellow.



Pollinaria enlarged about 165x. The retinaculum here is long and narrow typical of many Philippine and Borneo hoyas species. The translators are placed well down the retinaculum.

Pollinium

length	0.53 mm
widest	0.16 mm

Retinaculum

length	0.23 mm
shoulder	0.08 mm
waist	0.04 mm
hip	0.08 mm
ext.	0.02 mm

Translator

length	0.09 mm
depth	0.04 mm

Caudicle

bulb diameter 0.09 mm

Translator/caudicle type: p/o

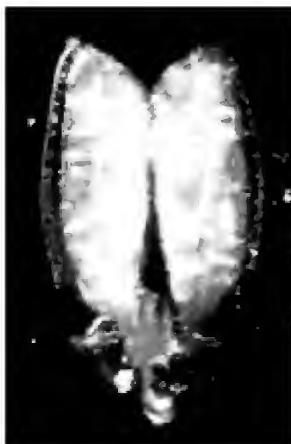
Pollinia apex type: T

Caudicle bulb: G

Retinacula character: E

Hoya finlaysonii Wight 1834

from Kim Yap collected Jahore State, Western Malaysia May 2003



This is a digital microscope picture of the pollinaria enlarged about 80X. I have at this time not learned to get the digital I can with a camera mounted monocular microscope. The pollinia outline shows the form but the detail in the retinaculum and translators is lacking. Below is the microscope picture.



Pollinia

length	0.52 mm
Widest	0.20 mm

Retinacula

length	0.15 mm
shoulder	0.11 mm

waist	0.08 mm
hip	0.10 mm
ext.	0.05 mm

Translators

length	0.15 mm
depth	0.08 mm

Caudicle

bulb diam. 0.05 mm

Translator/caudicle type: p/o

Pollinia apex type: RT

Caudicle bulb: G

Retinacula character: S

Hoya amoena subsp. bogorensis Green & Kloppenburg 2014



Pollinaria enlarged ca.
150x.

Pollinium

length	0.52 mm
widest	0.21 mm

Retinaculum

length	0.14 mm
shoulder	0.20 mm
waist	0.07 mm
hip	0.11 mm
ext.	0.05 mm

Translator

length	0.07 mm
wide	0.04 mm

Caudicle

bulb diam.	0.05 mm
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Translator/caudicle type:
p/o

Pollinia end types: R

Caudicle bulb: C

Retinacula character: S

Hoya siniloanensis Kloppenburg, Guevarra & Carandang
2012-4-036



Two pollinaria enlarged ca. 100X.

Pollinium

length	0.50 mm
widest	0.18 mm

Inner end type: RT

Retinaculum

length	0.15 mm
shoulder	0.11 mm
waist	0.08 mm
hip	0.09 mm
ext	0.06 mm

Type: S

Translator

length	0.10 mm
widest	0.05 mm

Caudicle

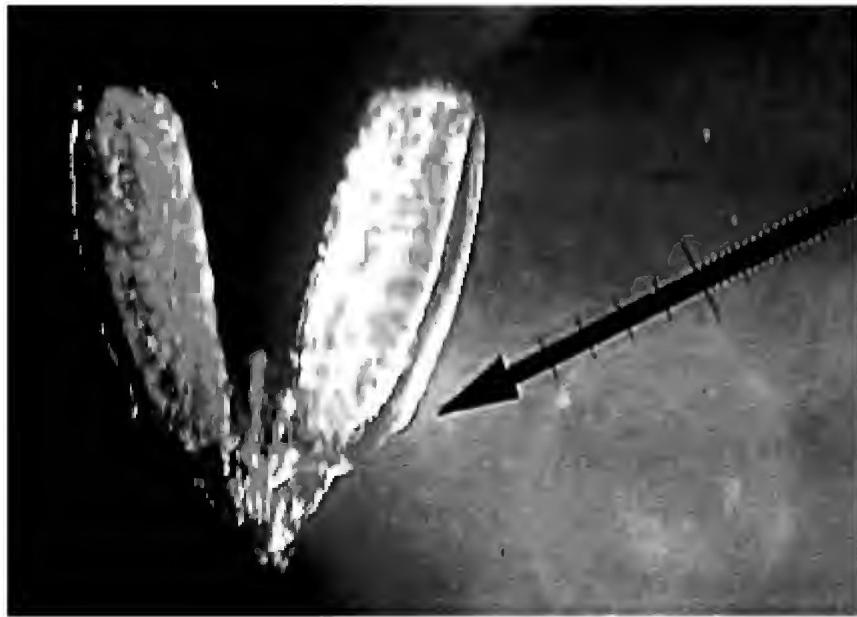
Type: C

bulb. diam. 0.07 mm

Translator type: p/o

Hoya calyxminuta Kloppenburg

ISSN 2329-7336



Pollinarium
enlarged about 165x.

Pollinium

length	0.50 mm
widest	0.16 mm

Retinaculum

length to crotch	0.20 mm
shoulders	0.08 mm
waist	0.05 mm
hip	0.09mm
extensions	0.03 mm

Translators

length	0.08 mm
depth	0.03 mm

Caudicle bulb diam. ca. 0.04 mm

Translator/caudicle type: p/o

Retinaculum type: E & HB

Pollinia inner ends: T

Hoya tauensis Kloppenburg sp. nova
Published in Asclepios 111: 14.2011



Pollinarium with one pollinia lost.
Enlarged about 165x. The dark arrow is 0.1 mm.
long. The pollinium has a pellucid edge as all
hoya species have, The translators are short, the
retinaculum had well developed shoulders and
waist.

Pollinia

length	0.50 mm.
widest	0.20 mm.

Retinaculum

length	0.15 mm. to crotch
shoulder	0.11 mm.
waist	0.04 mm.
hip	0.07 mm.
extensions	0.05 mm.

Translators

length	0.10 mm.
depth	0.024 mm.

Caudicle

bulb diam.	0.05 mm.
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Enlarged view of the retinaculum, showing translators somewhat deteriorates and the caudicles slightly collapsed. Retinaculum is about average sized for hoya species.

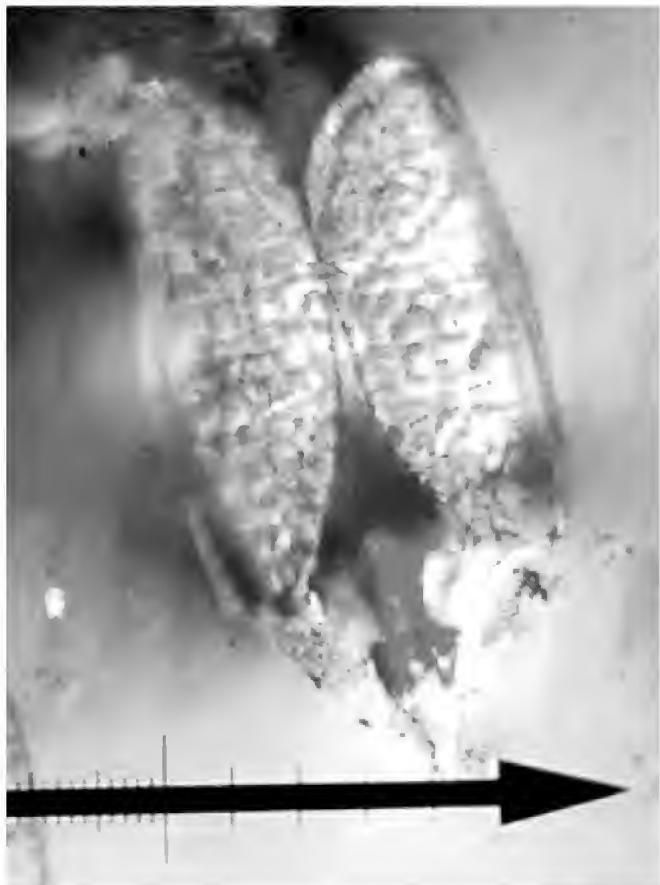
Ratio: poll/ret 2.5
poll length/width 2.5

Retinacula type: S

Translator/caudicle type: ls/o

Pollinia inner ends: R





Pollinarium enlarged about 165x.

Pollinium:

length	0.50 mm.
widest	0.14 mm.

Retinaculum:

length	0.12 mm.
shoulder	0.12 mm.
waist	0.03 mm,
hip	0.06 mm.
ext.	0.04 mm.

Translator:

length	0.09 mm.
depth	0.04 mm.

Caudicle:

bulb diam.	0.04 mm.
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Ret.: pol. ratio 1:2.6

Translator/caudicle type: p/o

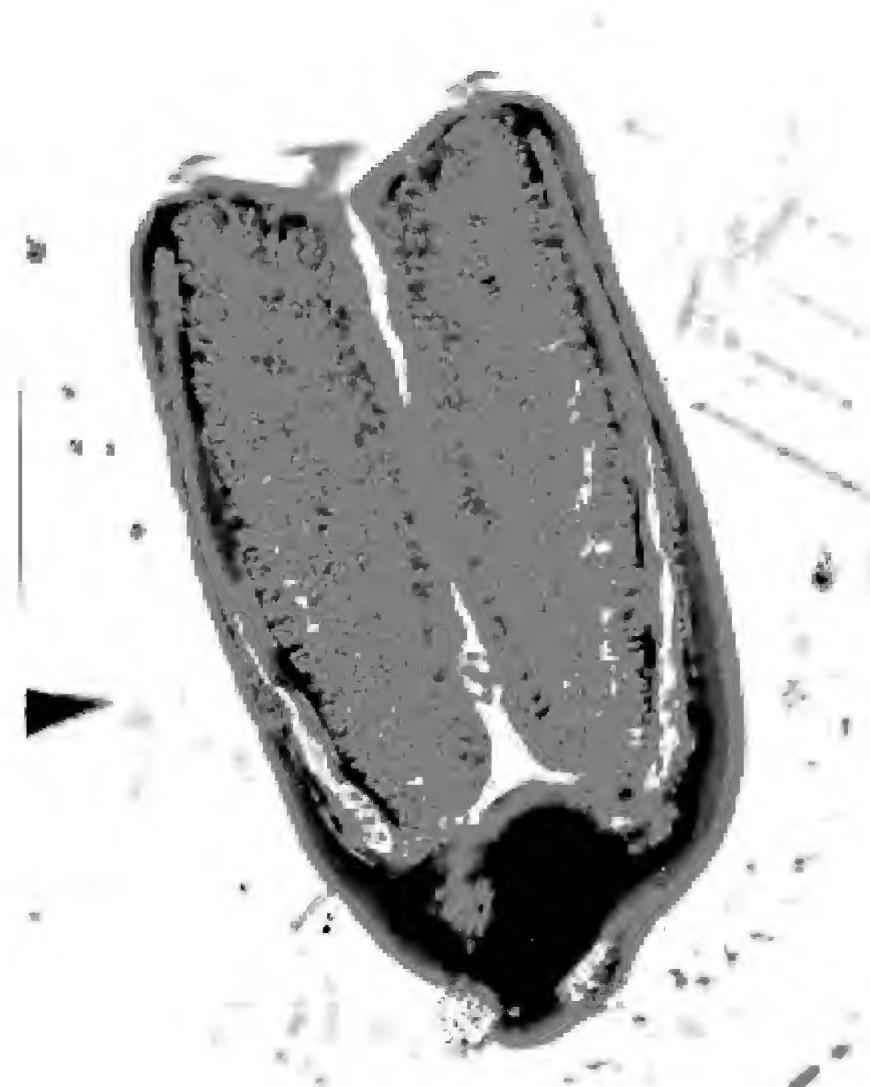
Pollinia inner end type: T

Retinacula type: HS but with

unusual hips and shoulders

Hoya sp. 900129

Bloom from 9/8/93 collected at **Catanduanes** 63 flowers per cluster. Appears to be *Hoya crassicaulis*.



Pollinium
enlarged about
165x. Retinacula is
tilted a little so
difficult to make
out details of the
structure.

The best I can measure this: **Pollinium**

length	0.49 mm
widest	0.16 mm

Retinaculum

length	0.19 mm
widest	0.05 mm all nearly same width
ext.	0.05 mm

Translators ca. 0.05 mm long and 0.01 mm in depth. Caudicle bulb ca. 0.04 mm in diam.

Translator/caudicle type: p/o

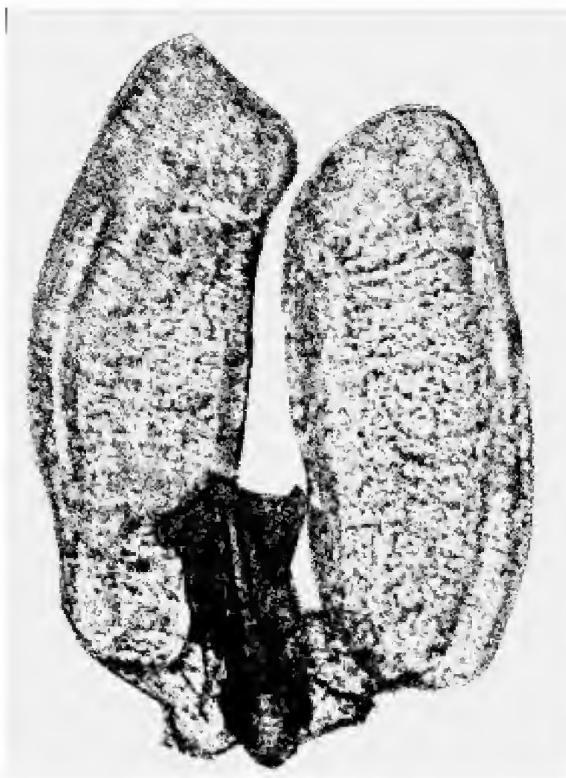
Pollinia inner end type: T

Caudicle bulb: G

Retinacula character: S ?

Hoya sp. Edano (PNH) 14203 1951

Victoria Mts. Palawan, Philippines.



Magnified approximately 165x.

Pollinium

length:	0.48 mm
widest:	0.20 mm

Retinaculum

length:	0.18 mm
shoulder:	0.13 mm
waist:	0.05 mm
hip:	0.08 mm
ext.:	0.04 mm

Translators

length:	0.06 mm
depth:	0.02 mm

Caudicle

bulb. diam.:	0.06 mm
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Translator/Caudicle Type: p/o

Pollinia inner end type: RF

Caudicle bulb: G

Retinacula character: HU

Hoya sp. CAHUP 3935, Hernaez 2 March 1990



Pollinarium enlarged about 165x. This is very similar to that of *H.. cardiophylla* and *H. crassicaulis*. Translators are attached near the base of the long retinaculum.

Pollinium

length	0.48 mm
widest	0.17 mm

Retinaculum

length	0.22 mm
shoulder	0.08 mm
waist	0.07 mm
hip	0.08 mm
ext.	0.02 mm

Translators

length	0.09 mm
widest	0.04 mm

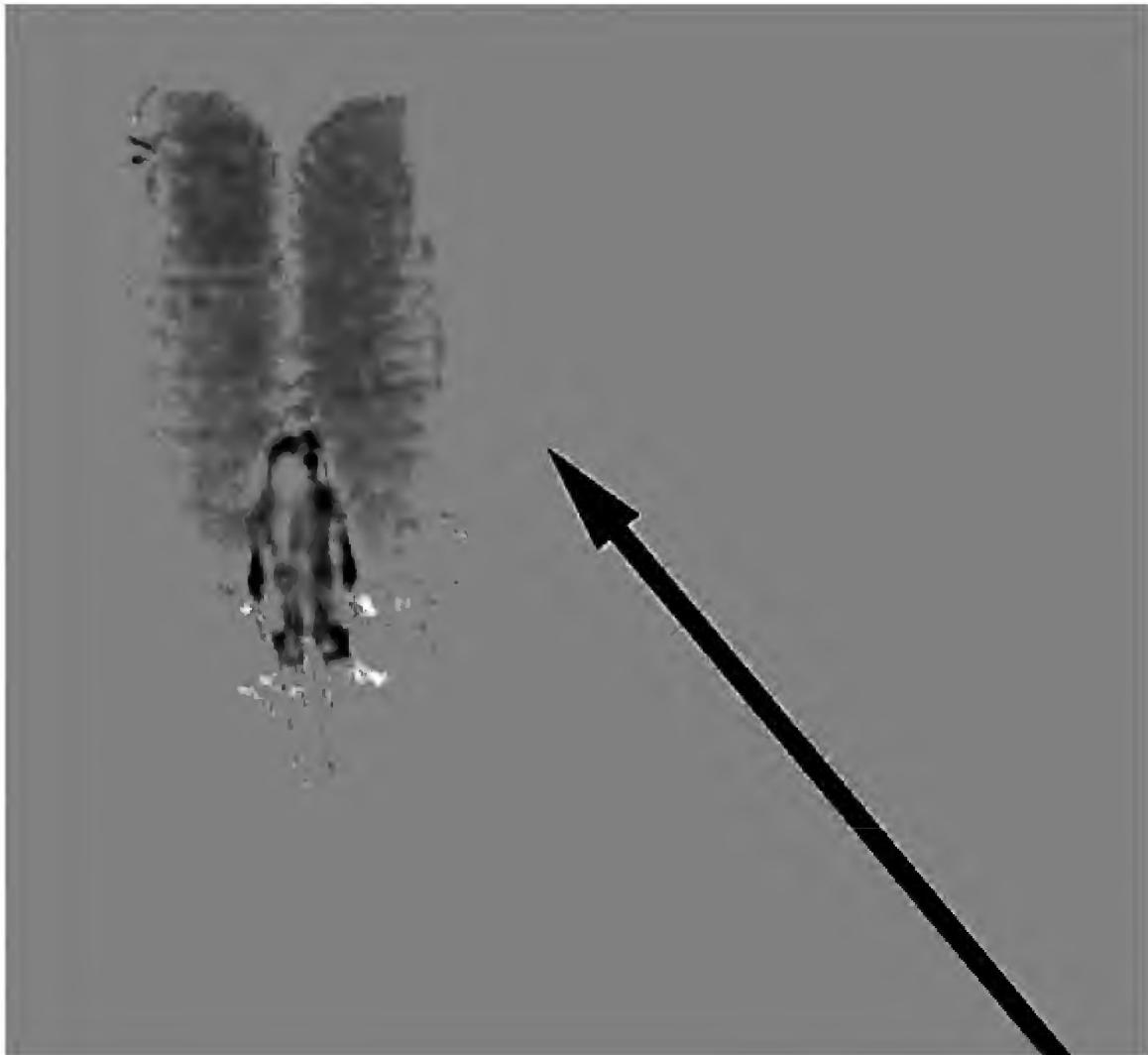
Translator/caudicle type: p/o

Pollinia inner end type: RT

Caudicle bulb: G

Retinacula character: LS

***Hoya marlowii* Kloppenburg & Mendoza (unpublished) GM #15**



Pollinaria enlarged ca. 150x

Pollinium

length	0.47 mm
widest	0.14 mm

Translator/caudicle type: p/o

Pollinia end type: R

Retinaculum

length	0.18 mm
shoulder	0.09 mm
waist	0.05 mm
hip	0.08 mm
ext.	0.07 mm

Caudicle bulb: G

Translators

length	0.08 mm
widest	0.06 mm

Retinacula character: LS

Caudicle

bulb diam.	0.07 mm
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Hoya Clemensiorum Green 2001

Type clone



The pollinarium enlarged about 165x. This is a beautiful structure, well defined and distinctive. The pollinia are well proportioned with a pellucid edge extending from the inner apex down the side to above the inner apex. The retinaculum is very long with narrow shoulder area tapering to a widened hip area and then narrowing considerably and the extensions are very short. Pollen grains are well defined, translators are broad in depth well structures supporting small clear caudicles.

Pollinia

length	0.47 mm
width	0.16 mm

Retinaculum

length	0.22 mm
shoulder	0.07 mm
waist	0.05 mm
hip*	0.06 mm
ext.	0.02 mm

Translators

length	0.11 mm
depth	0.05 mm

Caudicle

bulb diam.	0.05 mm
Granulate	

*Double hip present, lower 0.098 mm very broad.

Translator/caudicle Type: p/o

Pollinia inner end type: R

Caudicle bulb: G

Retinacula character: E

Hoya sp. Long Miau #1405 8/25/00

Flowers from Ted Green 9/7/00

Pollinaria enlarged about 165x. Retinacula very long and narrow. Translators are D shaped with narrow cupped tops.



Pollinia

length	0.47 mm
widest	0.14 mm

Retinaculum

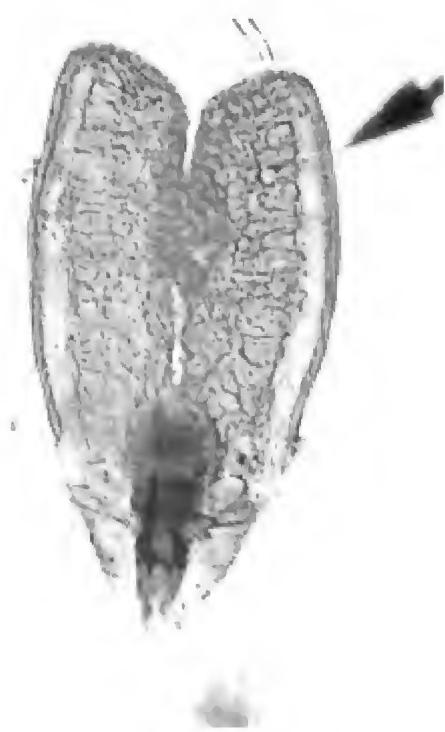
length	0.26 mm
shoulders	0.06 mm
waist	0.04 mm
hip	0.05 mm
ext.	0.02 mm

Translators

length	0.08 mm
depth	0.05 mm

Caudicle bulb diam. 0.04 mm

In this instance the retinaculum seems to have a more rounded wider head than the pollinaria above, this may be due to focal length at exposure.



Pollinium

length	0.51 mm
widest	0.17 mm

Retinaculum

length	0.20 mm
shoulder	0.11 mm
waist	0.04 mm
hip	0.05 mm
ext.	0.10 mm

Translators base almost perpendicular

length	0.10 mm
widest	0.03 mm

Caudicle

bulb diameter 0.05 mm

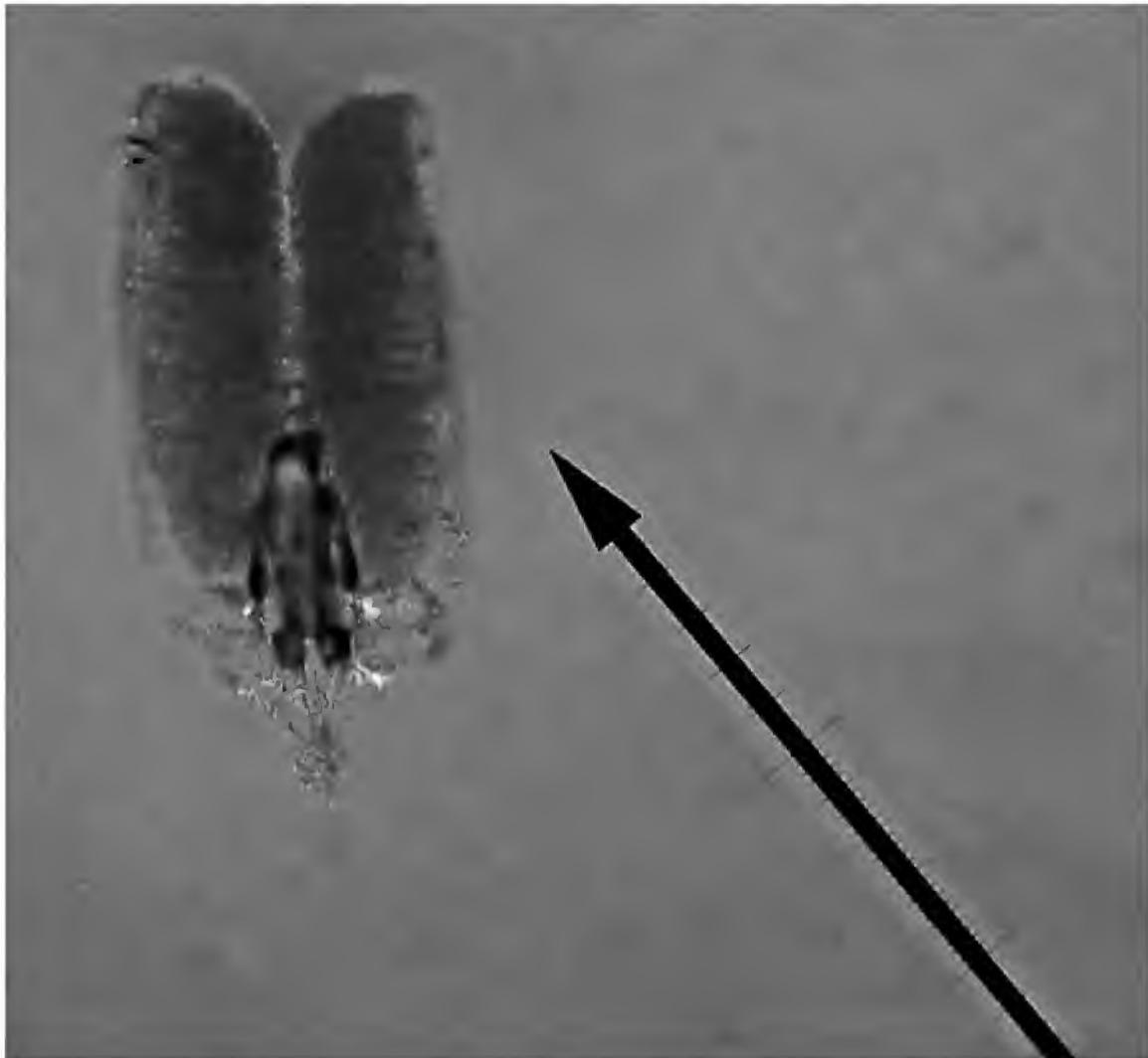
Translator/caudicle type: p/o

Pollinia end type: T

Caudicle bulb: G

Retinacula character: E

Hoya marlowii Kloppenburg & Mendoza



Pollinaria enlarged ca. 150x

Pollinium

length	0.47 mm
widest	0.14 mm

Retinacula: LS

Translator/caudicle type: p/o

Pollinia end type: R

Retinaculum

length	0.18 mm
shoulder	0.09 mm
waist	0.05 mm
hip	0.08 mm
ext.	0.07 mm
length	0.08 mm

Translators

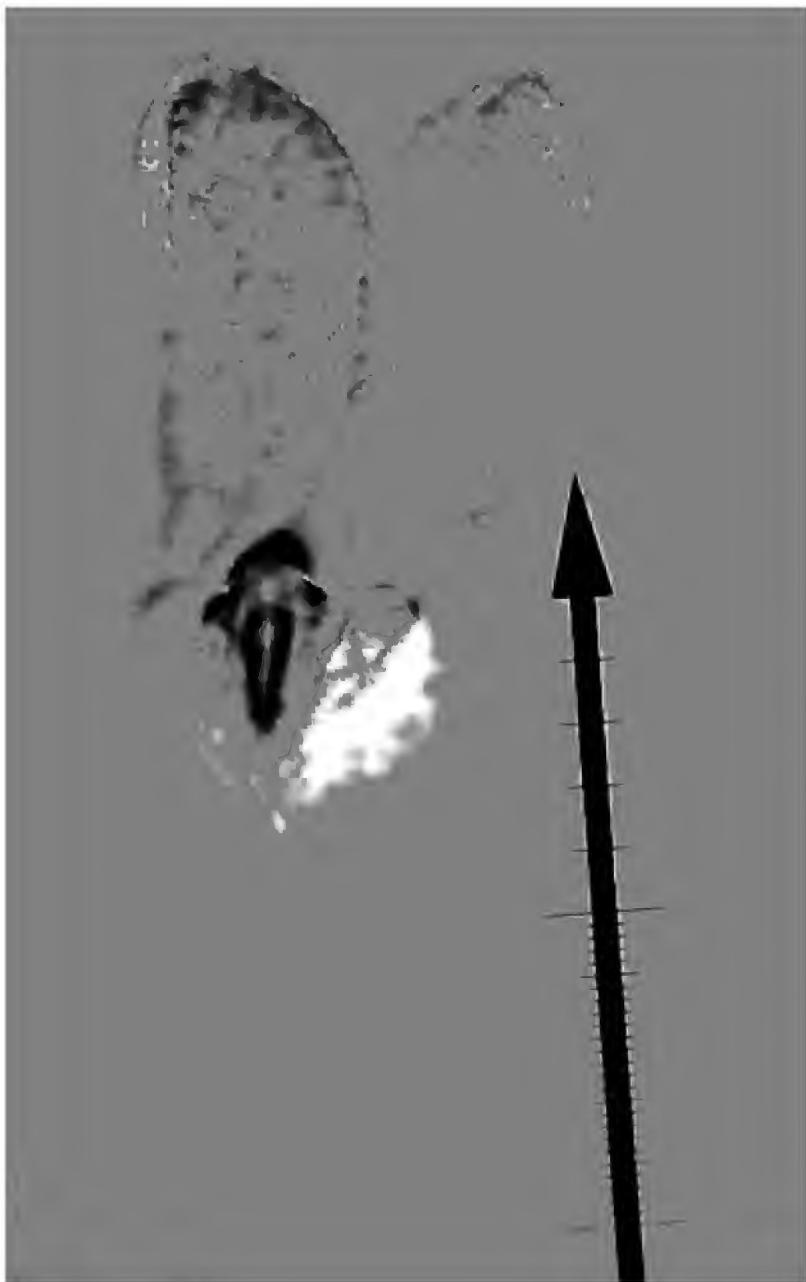
length	0.08 mm
widest	0.06 mm

Caudicle

bulb diam.	0.07 mm
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Caudicle bulb type: G

***Hoya lavacensis* Kloppenburg, Guevarra & Carandang**



Pollinarium enlarged ca.
151x.

Pollinium:

length	0.46 mm
widest	0.18 mm

Retinaculum:

length	0.14 mm
shoulder	0.12 mm
tapering to extensions	
ext.	0.03 mm

Translator:

length	0.10 mm
depth	0.03 mm

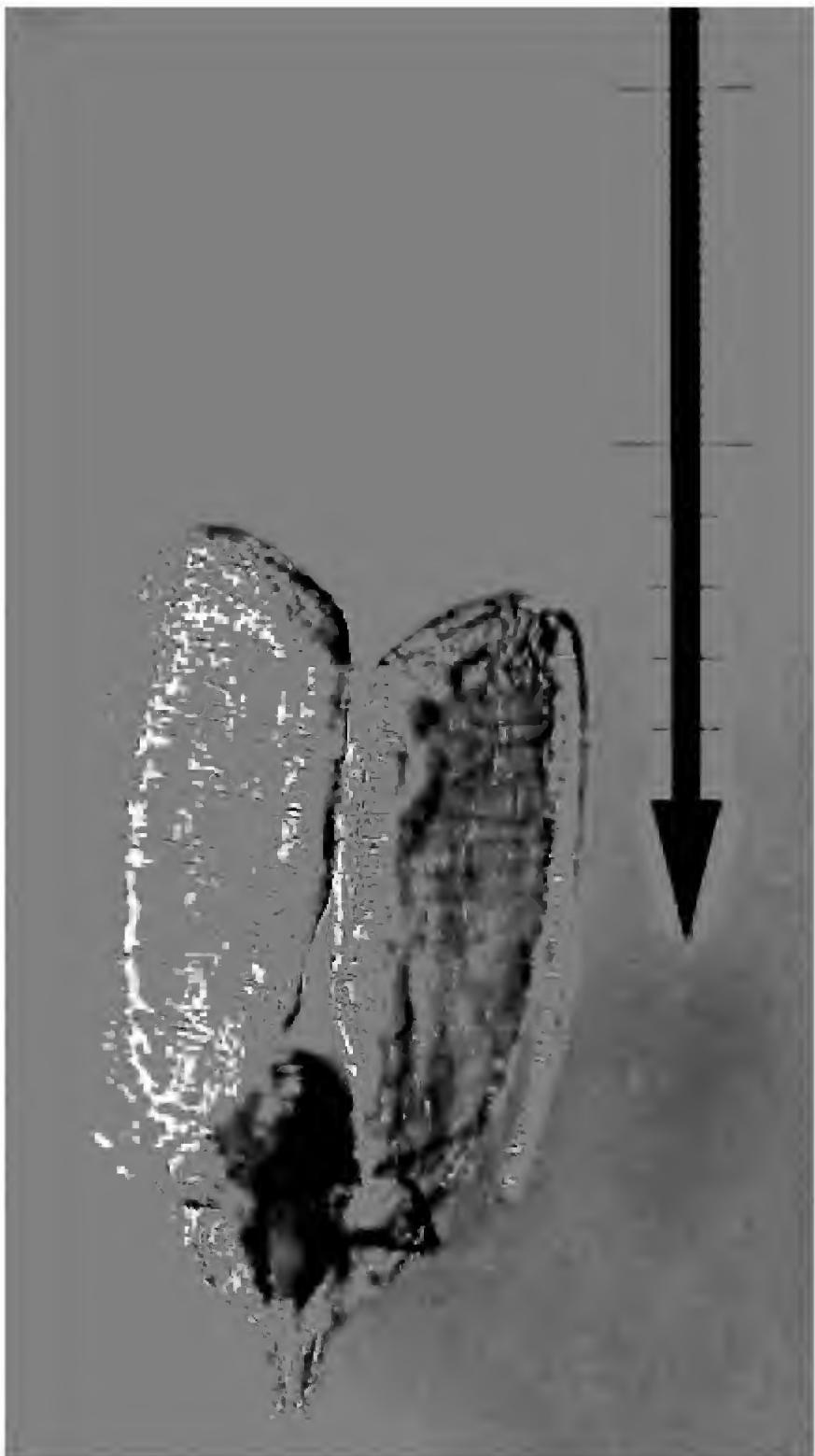
Caudicle:

bulb diam.	0.04 mm
granulate	

Translator type: p/o

Pollinia inner end type:
T

Retinacula character: S



Enlarged ca. 200x.

Pollinium

length 0.45 mm
widest 0.17 mm

Retinaculum

length 0.17 mm
shoulder 0.12 mm
waist 0.05 mm
hip 0.07 mm
ext. 0.10 mm

Translator

length 0.06 mm
depth 0.03 mm

Caudicle

bulb diam. 0.05 mm

Arrow head
represents 0.1 mm
In photo it is ca. 2
cm long.

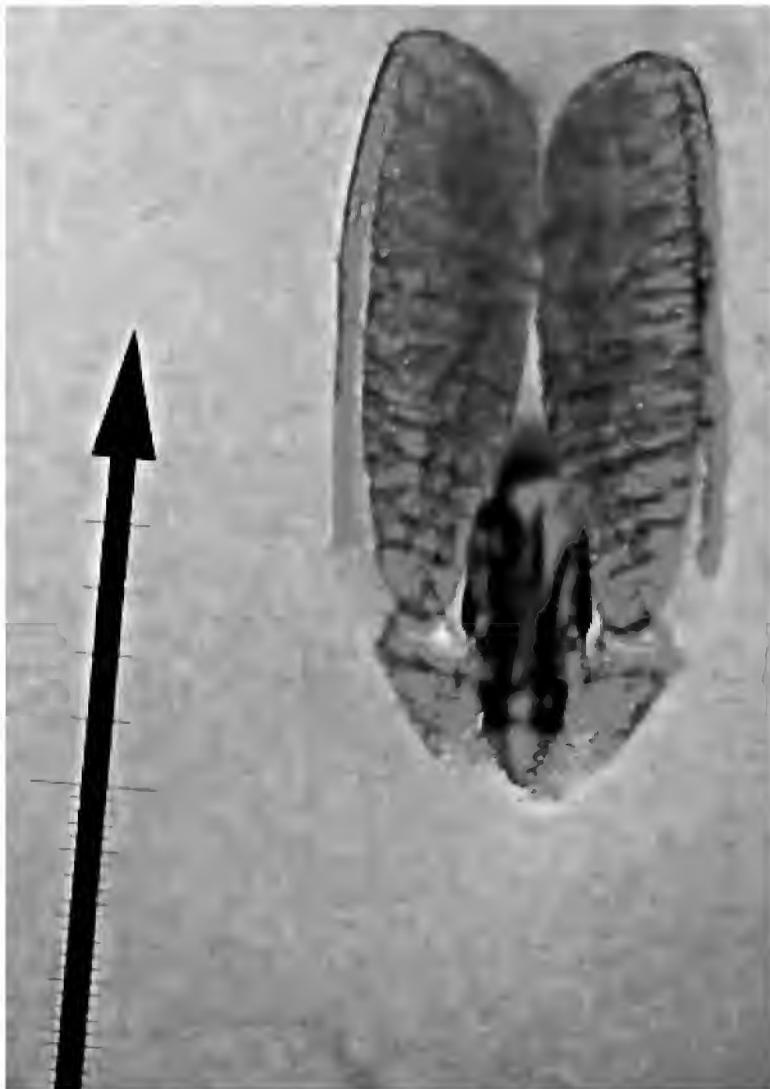
Retinacula
character: R

Caudicle bulb: G

Translator/caudicle type: p/o

Hoya marlowii subsp. polilloensis Kloppenburg & Mendoza

Pollinia inner apex type: T



Pollinarium enlarged 150x.

Pollinium

length	0.45 mm
widest	0.15 mm

Retinaculum

length	0.20 mm
widest	0.11 mm
narrowest	0.08 mm
extensions	0.05 mm

Translator

length	0.09 mm
widest	0.06 mm

Caudicle

bulb diam.	0.07 mm
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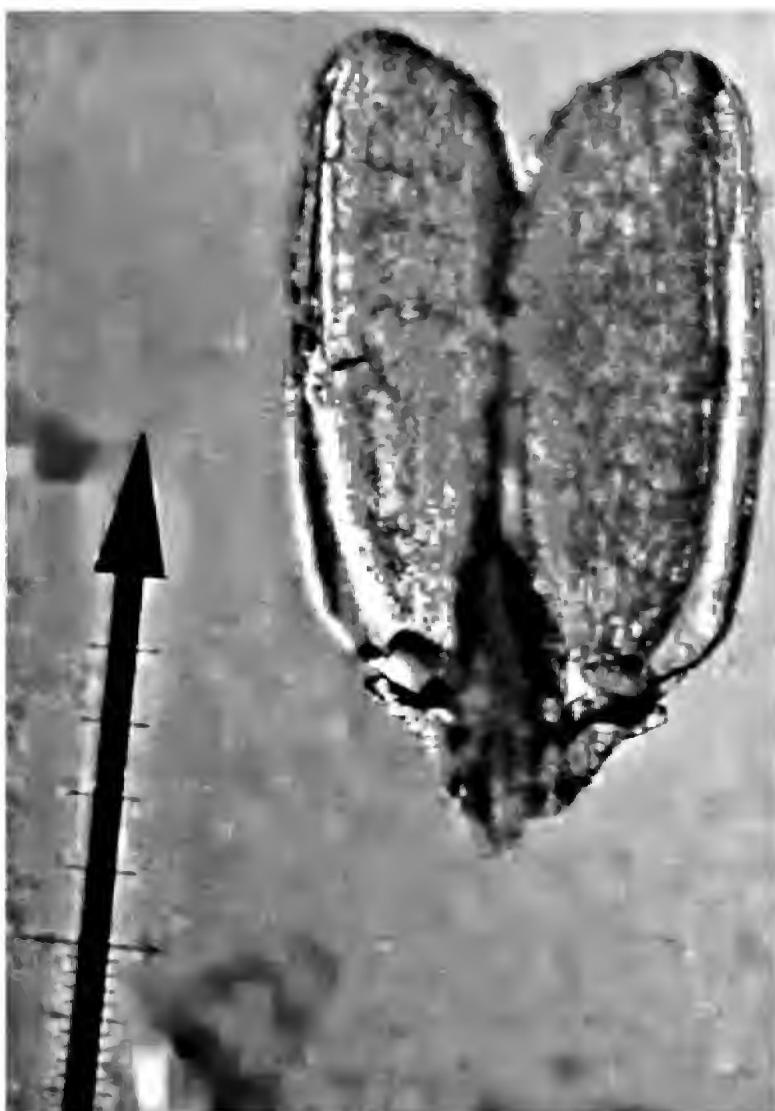
Translator/caudicle type:
p/o

Pollinia inner apex type:
RT

Caudicle bulb: C

Retinacula character: LS

Hoya lucbanensis subsp. papillata Kloppenburg & Mendoza



Pollinaria enlarged 180x.

Pollinium

length	0.44 mm
widest	0.20 mm

Retinaculum

length	0.17 mm
shoulder	0.10 mm
waist	0.05 mm
hip	0.07 mm
ext.	0.03 mm

Translator

length	0.09 mm
widest	0.03 mm

Caudicle

bulb diam.	0.05 mm
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Translator/caudicle type:
p/o

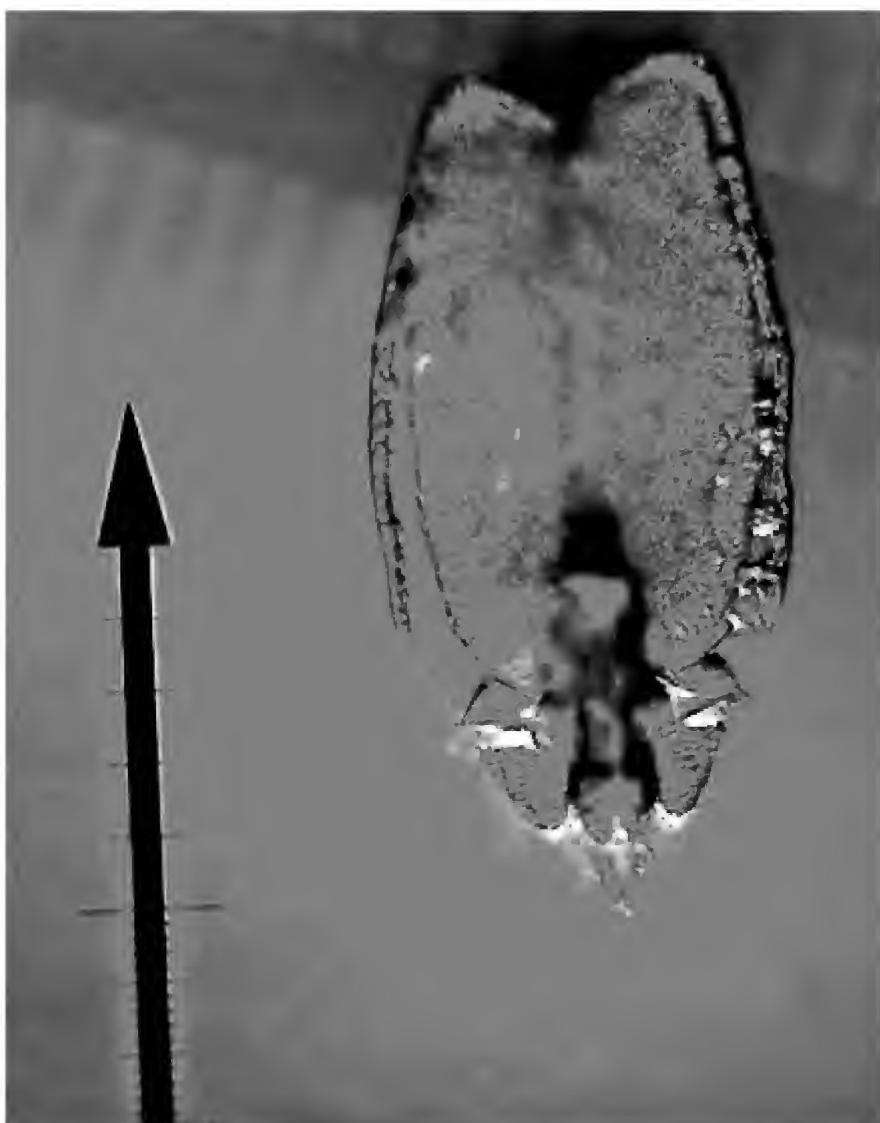
Pollinia apex type: RT

Caudicle bulb: C ?

Retinacula character: HE
?

Hoya lucbanensis Kloppenburg & Mendoza

(unpublished) GM #129



Pollinarium
enlarged ca. 170x.

Pollinium

length	0.43 mm
widest	0.17 mm

Retinaculum

length	0.19 mm
shoulder	0.10 mm
waist	0.05 mm
hip	0.07 mm
ext.	0.04 mm

Translator

length	0.16 mm
widest	0.04 mm

Caudicle

bulb diam.	0.06 mm
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Translator/caudicle type: p/o

Retinacula character: 2S

Pollinia apex type: R

The pollen grains here are very fine. The retinaculum is long with an unusual head, and two shoulder areas.

***Hoya velasioii* Kloppenburg 2015**

CAHUP 9136

Photos 14 November 2006 seems closest to *Hoya crassicaulis* Elmer ex Kloppenburg.



Pollinaria
enlarged about
165x.

Pollinium

length	0.43 mm
widest	0.14 mm

Retinaculum

length	0.15 mm
shoulder	0.08 mm
waist	0.07 mm
hip	0.08 mm
ext	0.06 mm

Translators

length	0.12 mm
depth	0.03 mm

Caudicle

bulb diam	0.05 mm
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Ratio: r/p 1.8

Translator/caudicle type: p/o

Retinacula type: LS

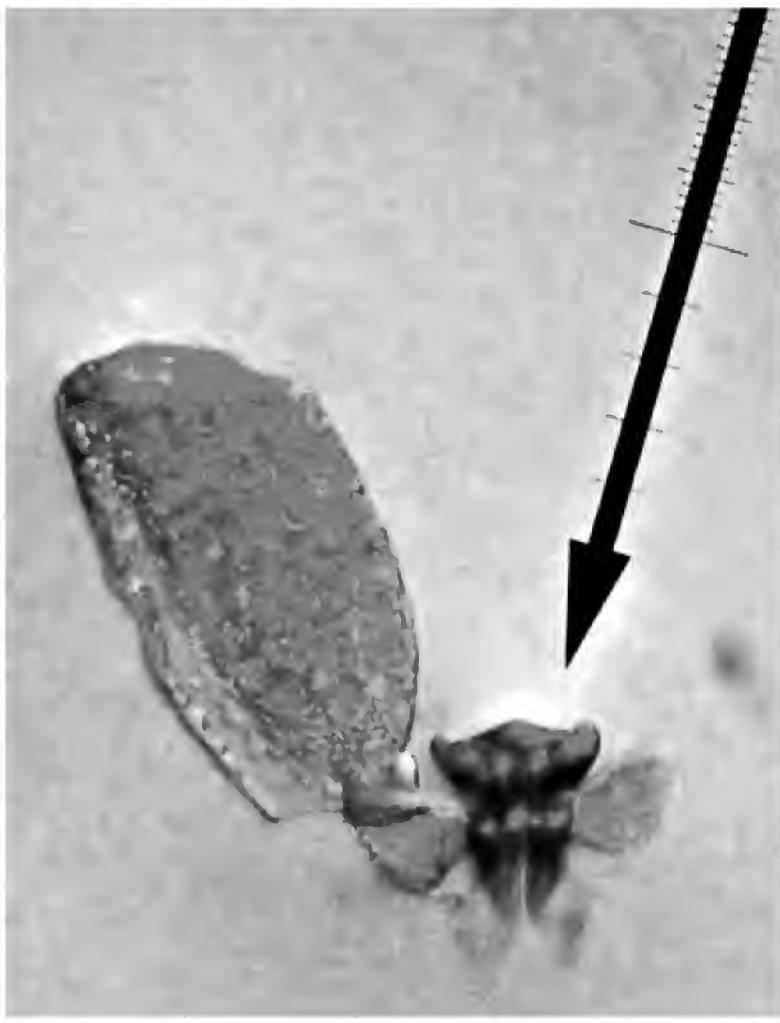
Pollinia inner end type: RT

Caudicle bulb: G

Retinacula character: LS

***Hoya blashernaezii* subsp *recurvula* Kloppenburg & Cajano**

(unpublished) AC #2



Pollinaria enlarged 150x.

Pollinium

length	0.42 mm
widest	0.21 mm

Retinaculum

length	0.11 mm
shoulder	0.15 mm
waist	0.06 mm
hip	0.09 mm
ext.	0.05 mm

Translator

length	0.10 mm
widest	0.06 mm

Caudicle

bulb 0.07 x 0.06 mm

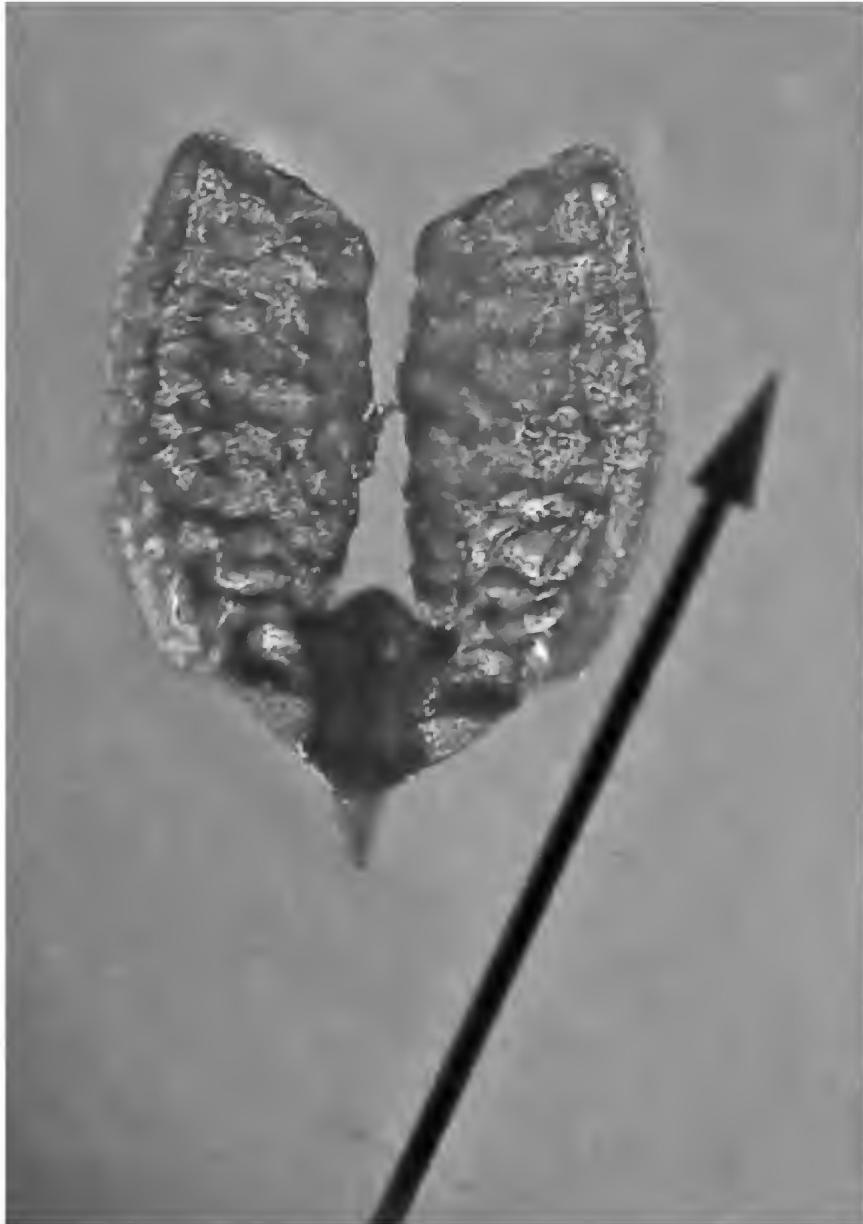
Translator/caudicle type:
p/o

Note: the horn like projections on the head of the retinaculum **Type:** HU.

The pollinia inner apex (top) are tapered "T" inward with rounded surfaces.

Caudicle bulb: C

Hoya blashernaezii subsp. grandiora Kloppenburg & Mendoza



Pollinaria
enlarged ca. 200x.

Pollinium
length 0.40 mm
widest 0.18 mm

Retinaculum
length 0.12 mm
shoulder 0.12 mm
waist 0.06 mm
hip 0.10 mm
ext. 0.02 m

Translator
length 0.06 mm
length 0.08 mm

Caudicle
bulb diam. 0.05 mm

Translator/caudicle type: p/o

Pollinia end type: F

Caudicle bulb: G

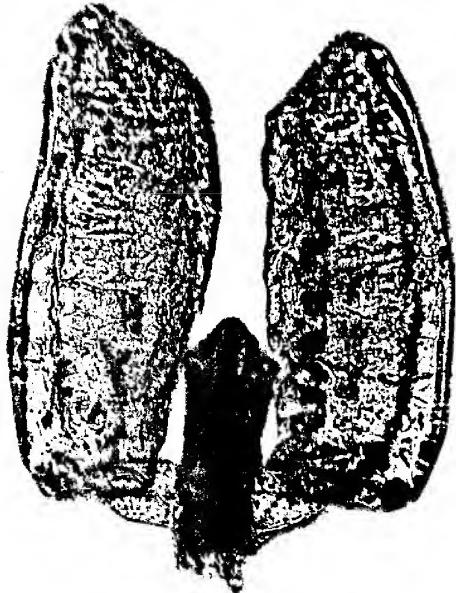
Retinacula character: S

Hoya odorata Schlechter 1906

Flower from Elmer 18041 (PNH) 1917, Los Banos, Mt. Maquiling,
Laguna, Philippines.

Note: this pollinarium does not match the one from the (UC) sheet of the same number. I believe this one is not from *H. odorata*. It appears to be *Hoya paziae*.

Magnified approximately 165x.



Pollinium

length:	0.40 mm
widest:	0.15 mm

Retinaculum

length:	0.20 mm
shoulder:	0.08 mm
waist:	0.06 mm
hip:	0.07 mm
ext.:	0.04 mm

Translators

length:	0.08 mm
depth:	0.04 mm

caudicle

diam.: ?

Translator/caudicle type: p/o

Pollinia apex type: F

Caudicle bulb: G ?

Retinacula character: LS

***Hoya querinoensis* Kloppenburg & Siar 2007**

Apocinaceae subfamily Asclepiadoideae genus Hoya

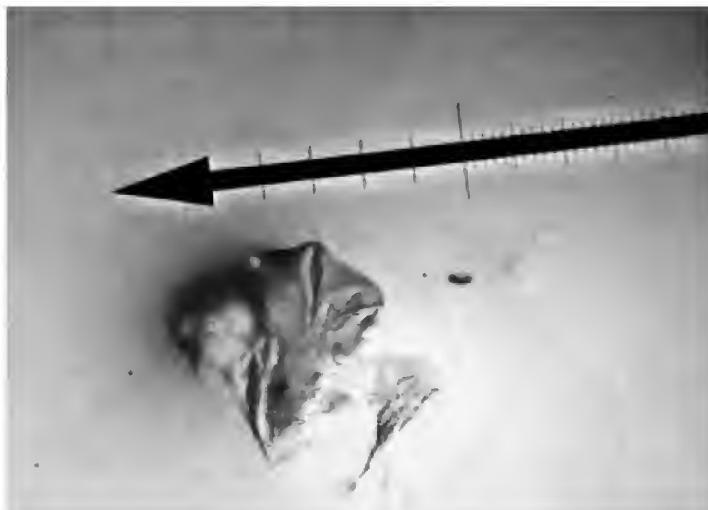


Photo with Epson digital camera of the retinaculum. Arrow is measurement scale. Head is 0.1 mm long.

Retinaculum:

length	0.20 mm
shoulder	0.15 mm
waist	0.06 mm
hip	0.10 mm
ext.	0.02 mm



Pollinium:

length	0.40 mm
widest	0.19 mm

Translators:

length	0.14 mm
depth ca.	0.03 mm

Ratio: ret/pol 1.8

poll width/length 2.14

Translator/caudicle type: d/o

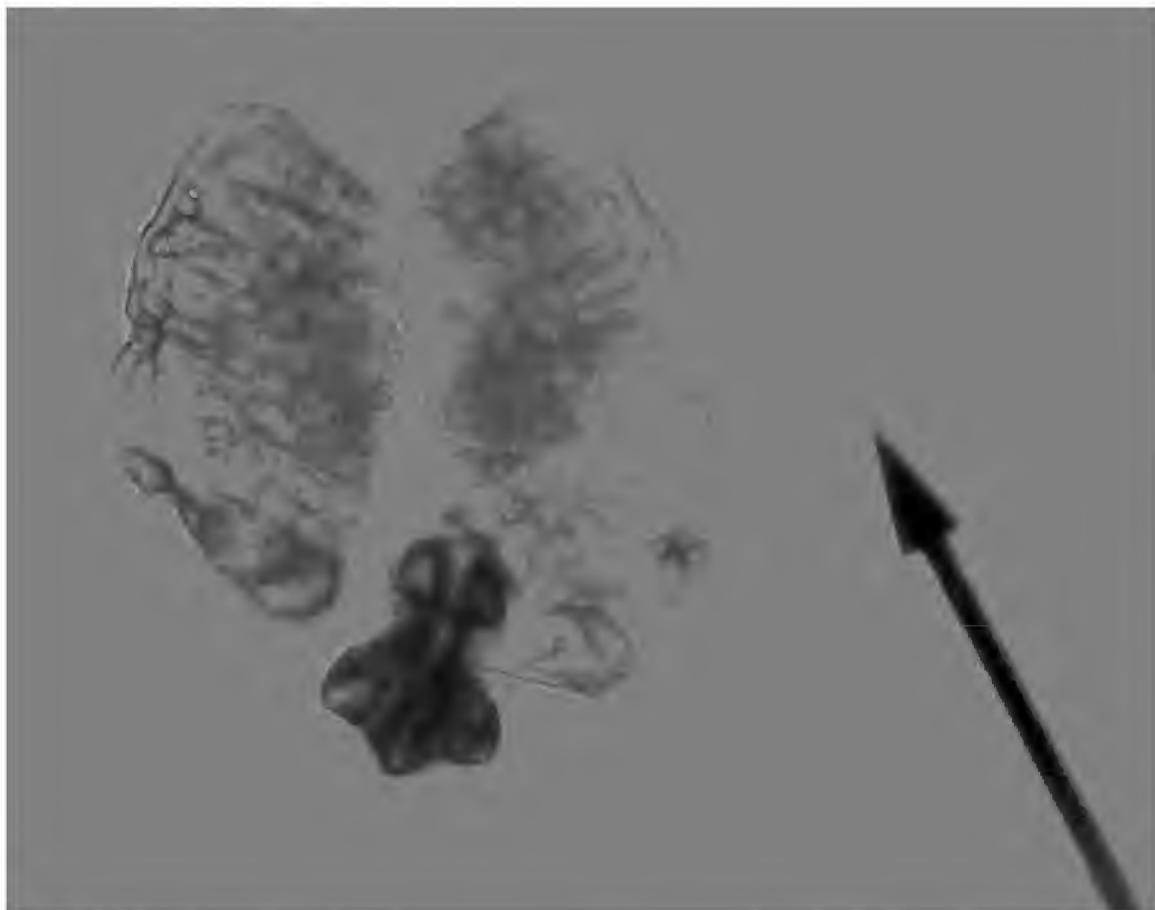
Retinacula character: S

Pollinia apex type: R

Photo of an intact pollinaria.

Hoya blashernaezii subsp. aurantiaca Kloppenburg & Mendoza

Pollinarium enlarged about 200x. Retinacula turned on its axis.



Pollinia

length	0.39 mm
widest	0.20 mm

Translator/caudicle type: p/o

Pollinia inner end type: RT

Retinaculum

length	0.19 mm
shoulders	0.13 mm
waist	0.07 mm
hip	0.08 mm
ext.	none visible

Caudicle bulb: C clear

Retinacula type: S

Translator

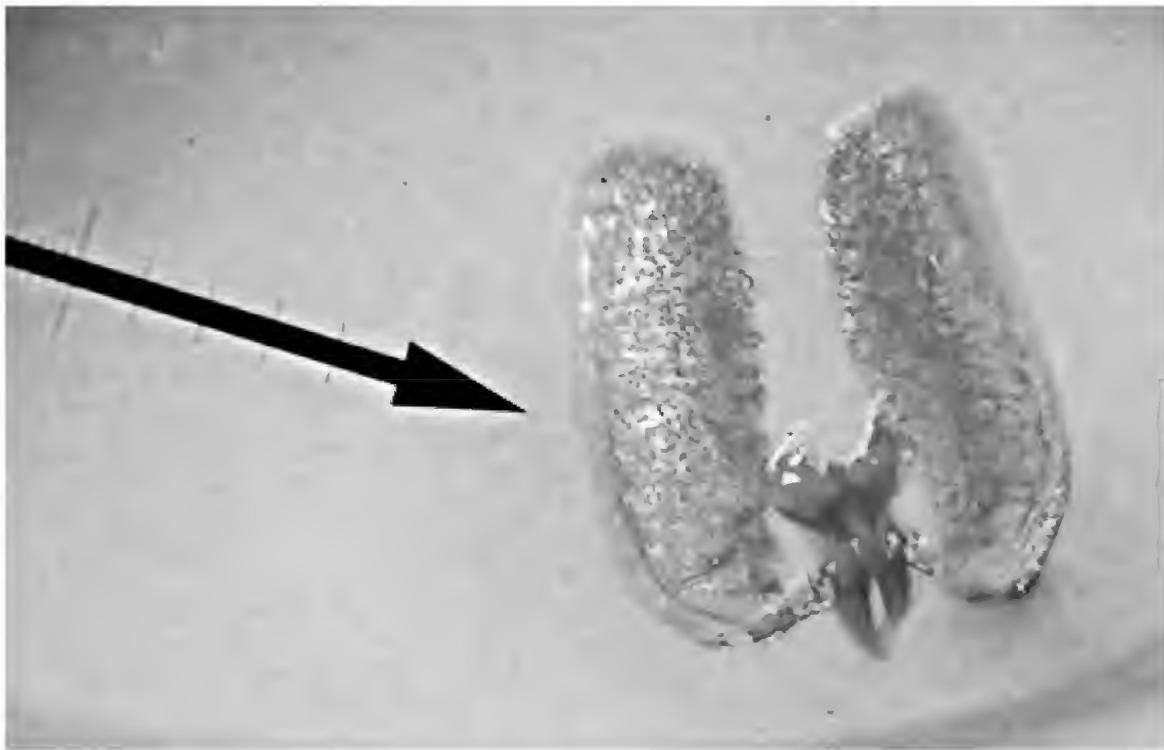
length	0.10 mm
widest	0.03 mm

Caudicle

bulb diam.	0.06 mm
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Hoya columna Kloppenburg 2014

CAHUP #41193



Pollinaria

length	0.38 mm
widest	0.13-16 mm

Retinaculum

length	0.09 mm
shoulder	0.10 mm
waist	0.04 mm
hip	0.06 mm

Translator

length	0.08 mm
depth	0.02 mm

Caudicle

bulb diam. 0.04 mm oval.

Translator/caudicle type: p/o ?

Retinacula character: HU

Pollinia end type: RT

Caudicle bulb: G

Ret:/Pol. ratio: 1:2.25

Hoya sp. CAHUP 63826



Pollinarium
enlarged about
165x.

Pollinium

length	0.38 mm
widest	0.15 mm

Retinaculum

length	0.16 mm
shoulder	0.07 mm
waist	0.03 mm
hip	0.07 mm
ext.	0.05 mm

Retinacula character: 2S

Caudicle bulb: C ?

Translators

length	0.05 mm
depth	0.02 mm

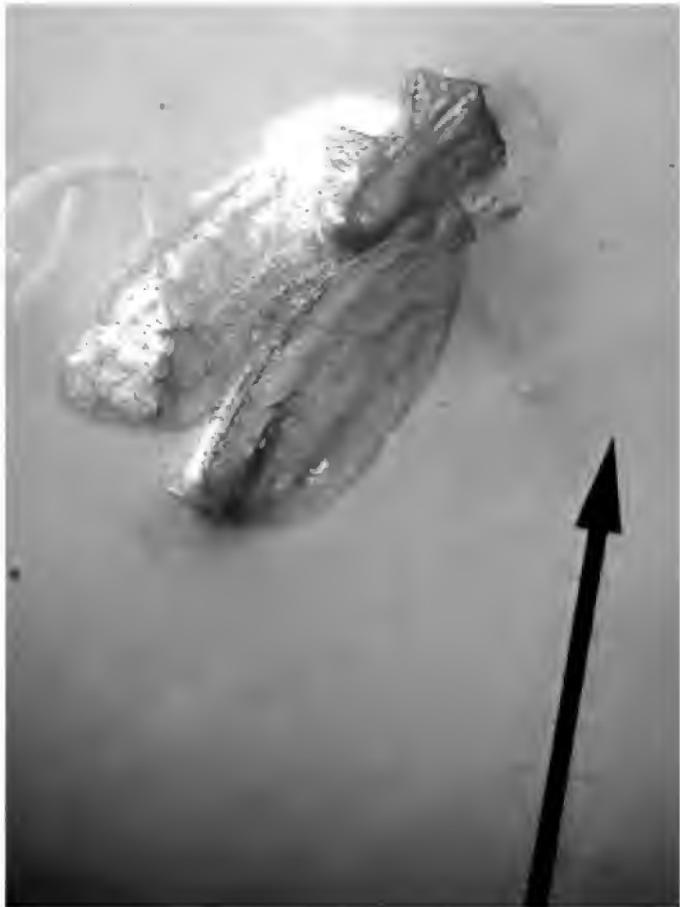
Translator/caudicle type: p/o

Pollinia inner apex type: R

Caudicle bulb. diam. 0.05 mm

Ratio: ret/poll 1.8; poll/width 2.5

Hoya sp. CAHUP 41945



The retinaculum has swiveled on the translator axis so the head is pointing up (right). A large retinaculum and small pollinaria.

Pollinium

length	0.37 mm
widest	0.16 mm

Retinaculum

length	0.20 mm
shoulder	0.13 mm
waist	0.04 mm
hip	0.06 mm
ext	0.01 mm

Translator

length	0.10 mm
depth	0.03 mm.

Caudicle not visible

Translator/caudicle type: p/o

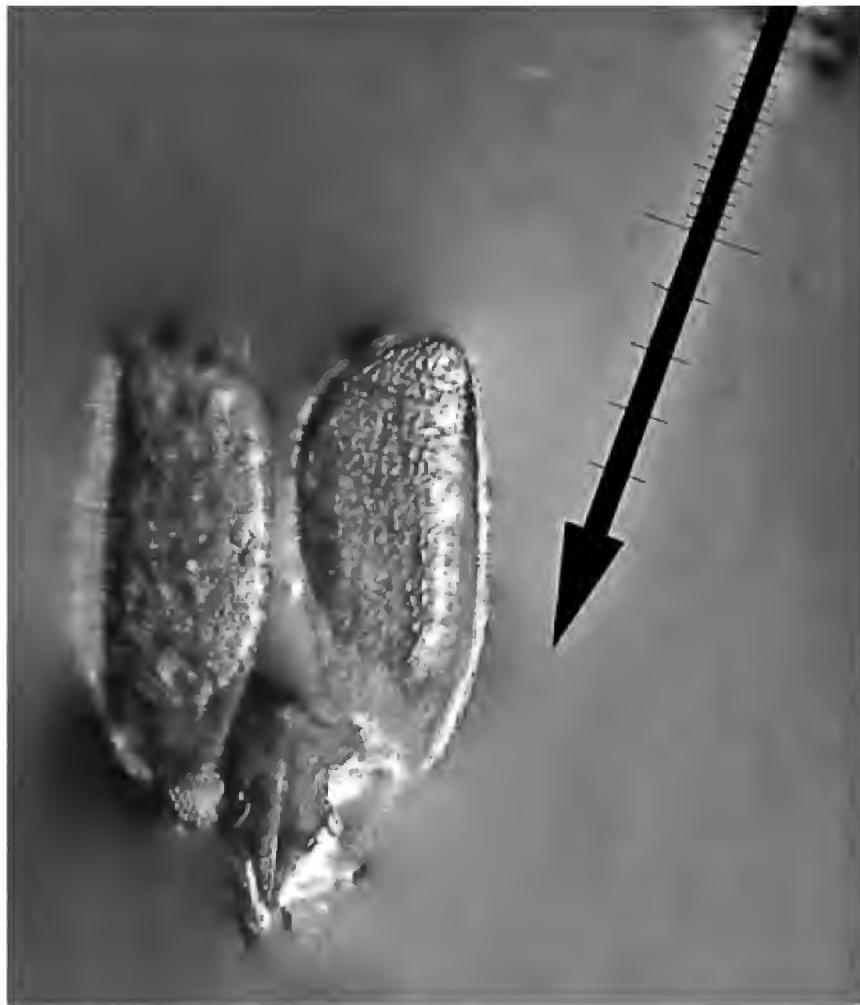
Pollinia inner apex type: R

Caudicle bulb: ?

Ratio: Ret./ Pol. 1:1.8

Retinacula character: S

Hoya sp. NS 005



Pollinaria enlarged ca. 165x.

The retinaculum here has a very broad head and my measurements of the length may be too long as it is difficult to determine where the How long the extensions are, overall length (length + extensions is correct). The translator and caudicle are difficult to separate. It appears even examining 5 pollinarium that the translators are somewhat delta shaped and the caudicles may have a granulate surface. I could not determine definitely.

Pollinium

length	0.37 mm.
widest	0.16 mm.

Translator/caudicle type: p/o

Retinaculum

length	0.18 mm.
shoulder	0.13 mm.
waist	0.08 mm.
hip	0.10 mm.
ext.	0.03 mm.

Pollinia inner end: R

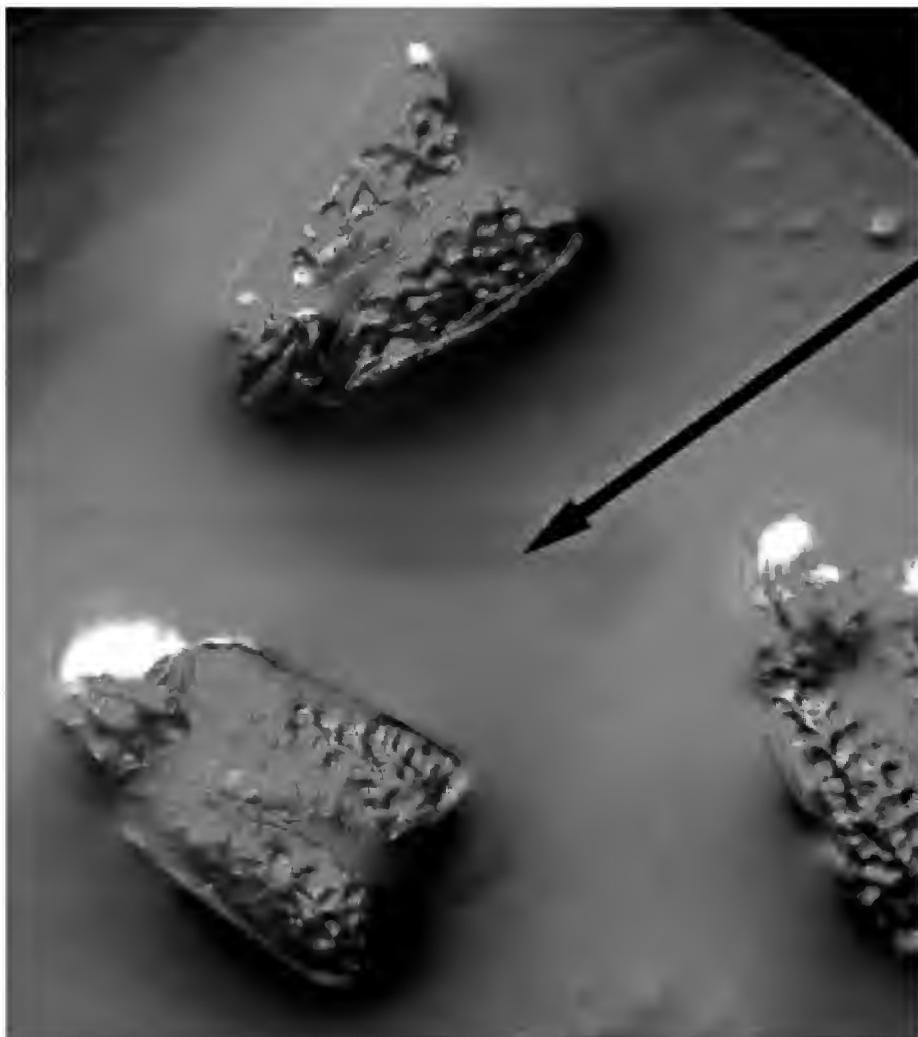
Translator

length	0.08 mm. depth	0.04 mm.
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Caudicle bulb: G

Retinacula character: S

Hoya bebsguevarrae Kloppenburg & Carandang 2013



Pollinarium
above
enlarged ca.
100x.

Pollinium		Caudicle	
length	0.35 mm	bulb diam.	0.05 mm
widest	0.12 mm	Type: C	
Retinaculum		Pollinia inner apex type: F	
length	0.10 mm		
shoulder	0.08 mm		
waist	0.06 mm		
hip	0.07 mm	Retinacula character: S	
ext.	0.05 mm		
Translator		Translator type: p/o	
length	0.08 mm		
depth	0.02 mm		

Hoya bicolensis Kloppenburg, Siar & Cajano 2013

Pollinarium enlarged about 165x.



Pollinium

length	0.35 mm
widest	0.15 mm

Retinaculum

length	0.08 mm
shoulders	0.08 mm
waist	0.05 mm
hip	0.07 mm
extensions	0.01 mm

Translator

length	0.07 mm
widest	0.03 mm
depth	0.01 mm

Caudicle

bulb diam.	0.03 mm
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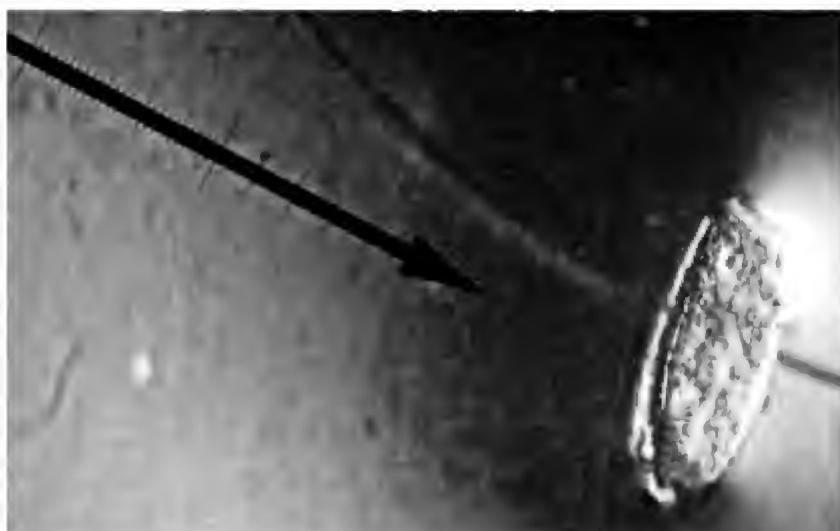
Ratios: p/r 4.4 p/w 2.3

Caudicle bulb: G ?

Translator/caudicle type: p/o

Retinacula character: S

Pollinia apex type: RT



Hoya nyhuusiae Kloppenburg 2003

Flower from Torill Nyhuus, Sweden. **Type clone.**



The pollinarium of this species is relatively small. Enlarged about 165x and then reduced 50% in scanning. The pollinia are broad and rounded at both ends. See the critical measurements above for details. The one thing I would have you note is the small horned projections from the head area of the retinacula which are unusual. The translators are narrow and the caudicles clear and bulbous.

Pollinia

length	0.29 mm
widest	0.13 mm

Retinaculum

length	0.11 mm long excluding extensions (0/03 mm).
head	0.07 mm with 0.01 mm projections,.
waist	0.04 mm wide
hip	0.07 mm wide

Translators

length	0.06 mm long curved upward semi-opaque.
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Caudicles

bulb diam.	0.05 mm clear.
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Translator/caudicle type: p/o

Pollinia inner end type: R

Caudicle bulb: C

Retinacula character: S

Hoya subrosea Kloppenburg & Mendoza



Pollinarium enlarged
200x.

Pollinium

length	0.28 mm
widest	0.15 mm

Retinaculum

length	0.09 mm
shoulder	0.08 mm
waist	0.05 mm
hip	0.07 mm
ext.	0.02 mm

Translator

length	0.08 mm
widest	0.03 mm

Caudicle

bulb diam.	0.03 mm
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Translator/caudicle type:
p/o

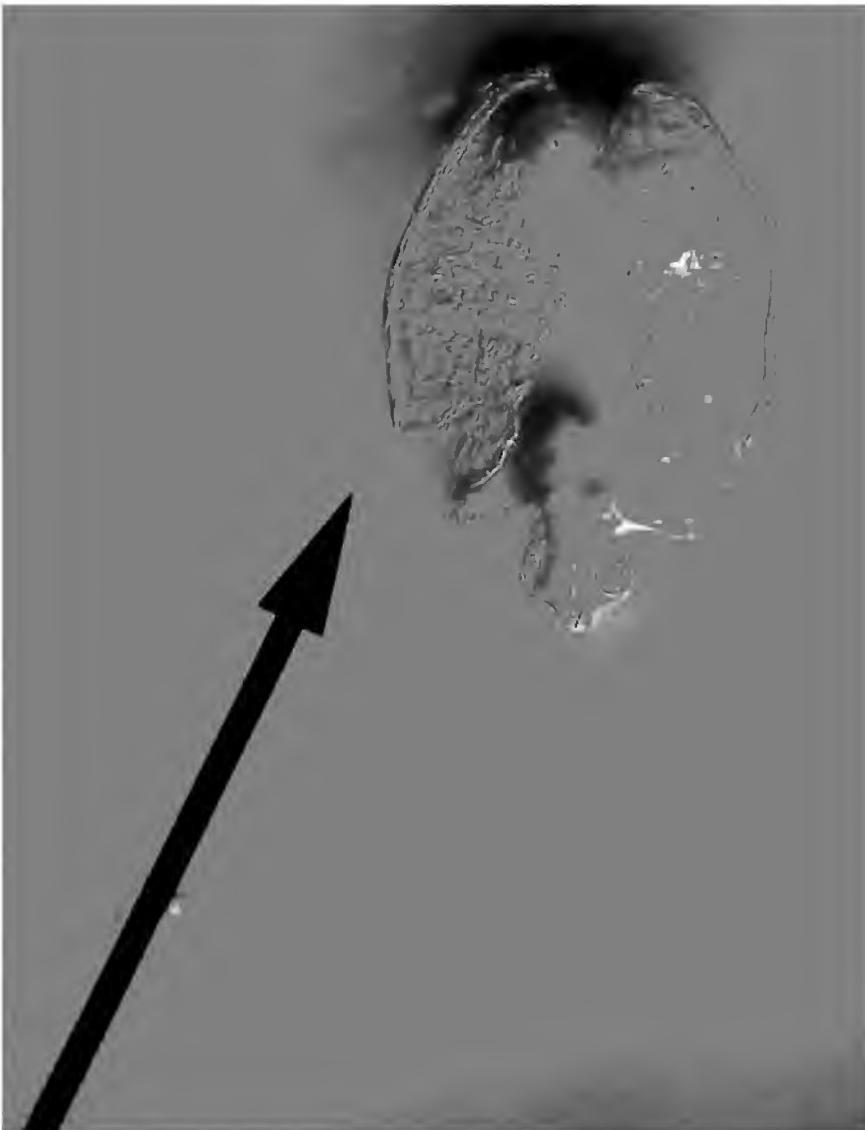
Pollinia apex type: R

Caudicle bulb: G

Retinacula character: S

Hoya pinnata Kloppenburg & Mendoza

(unpublished) GM #2



Pollinaria
enlarged ca. 250x.
The retinaculum
has turned on its
axis

Pollinium

length 0.28 mm
widest 0.12 mm

Retinaculum

length 0.10 mm
shoulder 0.07 mm
waist 0.04 mm
hip 0.08 mm
ext. 0.03 mm

Translator

length 0.07 mm
depth 0.02 mm

Caudicle

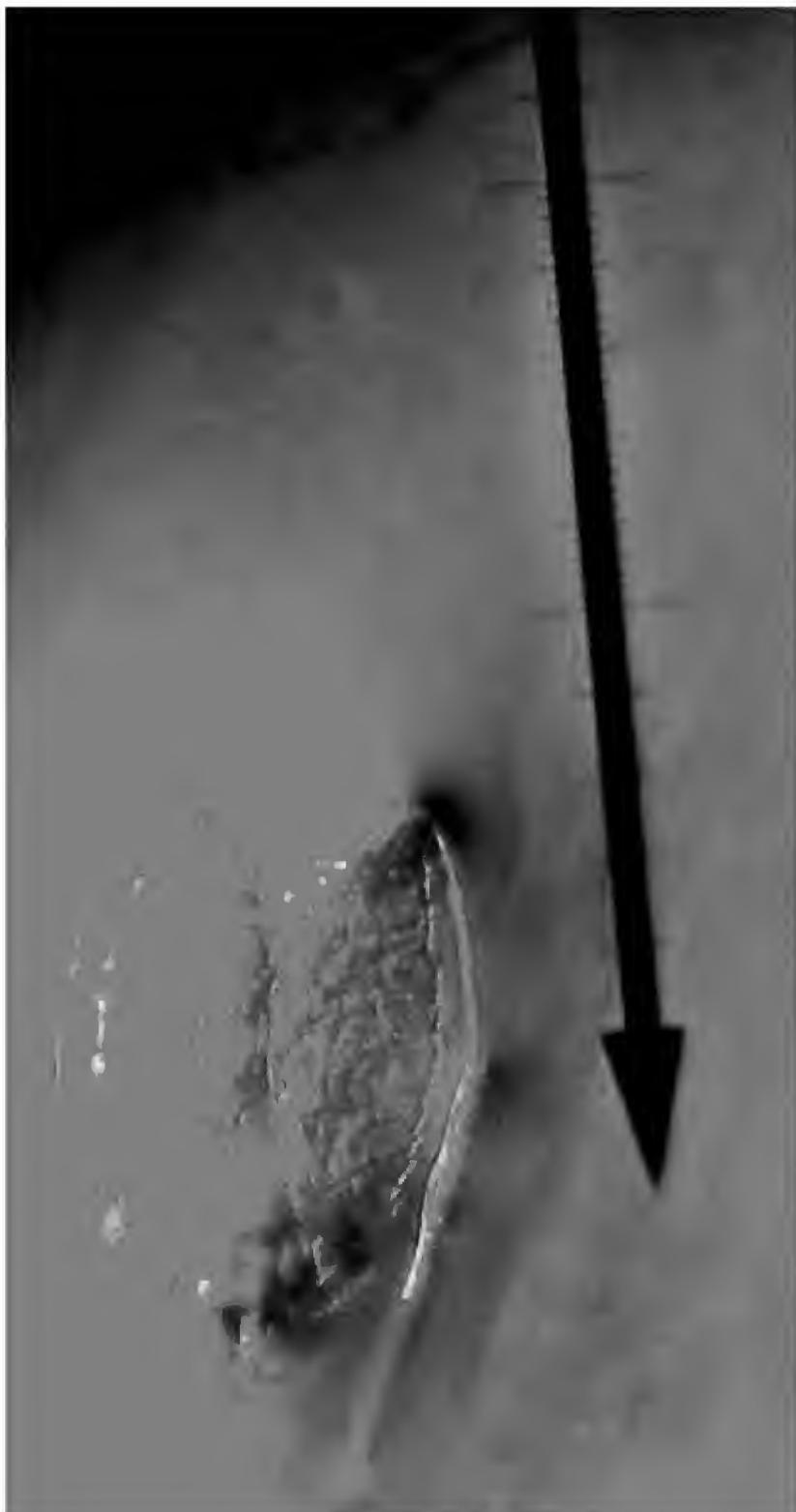
bulb diam. 0.03 mm

Translator/caudicle type: p/o

Pollinia end type: T

Caudicle bulb: ?

Retinacula character: S



Pollinarium enlarged
ca. 290x.

Pollinium

length 0.27 mm
widest 0.12 mm

Retinaculum

length 0.06 mm
shoulder 0.06 mm
waist 0.04 mm
hip 0.05 mm
ext. 0.04 mm

Translator

length 0.06 mm
depth 0.03 mm

Caudicle

bulb diam. 0.04 mm

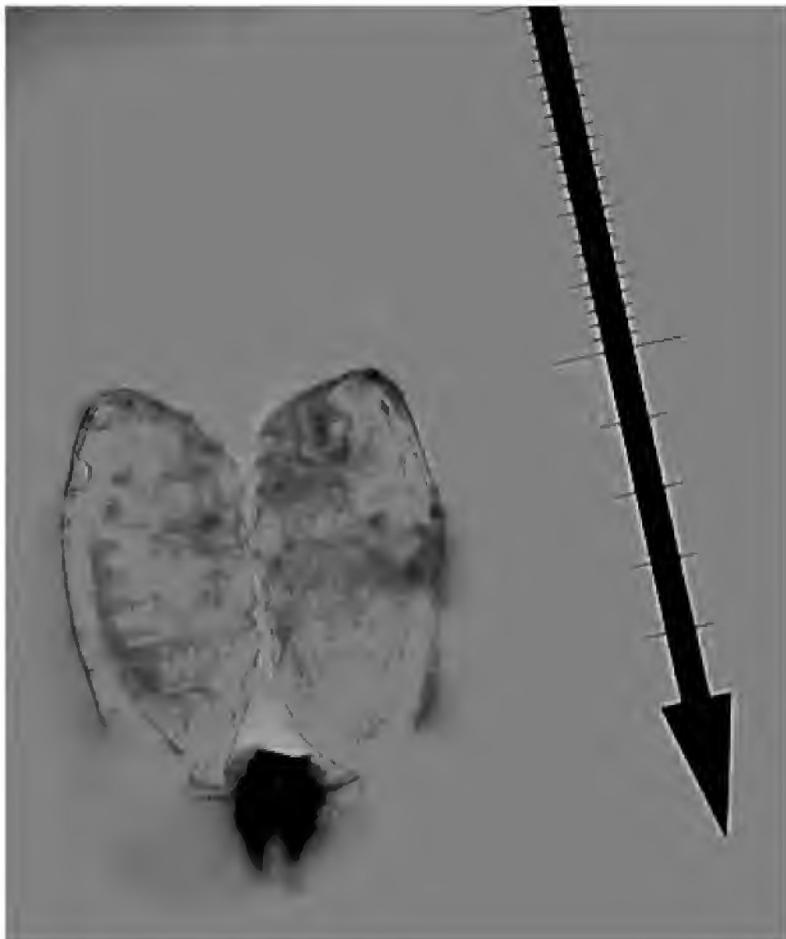
Ratios:

p/w 2.3
p/r 4.5

Translator/caudicle

Type: p/o
Pollinia end
type: F

***Hoya unruhiana* subsp. *maubanensis* Kloppenburg & Mendoza**
(unpublished) GM #143



Pollinaria enlarged ca.
180x.

Pollinium

length	0.24 mm
widest	0.14 mm

Retinaculum

length	0.05 mm
shoulder	0.08 mm
waist	0.05 mm
hip	0.06 mm
ext.	0.04 mm

Translator

length	0.03 mm
widest	0.01 mm +

Caudicle

bulb diam.	0.04 mm
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Translator/caudicle type:
p/o

Pollinia inner apex type:
T

Caudicle bulb: ?

Retinacula character: S



Pollinium

length	0.24 mm
widest	0.11 mm

Retinaculum

length	0.09 mm
shoulder	0.07 mm
waist	0.04 mm
hip	0.05 mm
ext	0.02 mm

Translator

length	0.04 mm
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Caudicle Type: G

bulb diam.	0.02 mm
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Ratios: p/r 2.7 p/w 2.2 Pollinia inner ends: R Retinacula: S

Pollinia Types 2018

d/o

1. **Hoya pubicorolla** subsp. **anthracina** Klopp., Ferreras & Mendoza 2013
2. **Hoya davaoensis** Kloppenburg 2013
3. **Hoya fuscomarginata** N. E. Brown 1901
4. **Hoya pachyclada** Kerr 1939
5. **Hoya as finlaysonii** Wight 1834
6. **Hoya pseudorigida** Kloppenburg, Siar
7. **Hoya cinnamomifolia** Hooker 1848
8. **Hoya paulshirleyi** Kloppenburg & Green 2010
9. **Hoya minibella** cultivated
10. **W.6528**
11. Hoya acuta green fkower
12. **Hoya sp.** shephardell
13. **Hoya sp.** 80-03 Borneo
14. Hoya sp. **USDA 354238**
15. **Hoya sp.** NS05-162
16. **Hoya wibergiae** Kloppenburg 2001
17. **Hoya betchei** (Schltr.) Whistler
18. **Hoya ubudensis** Kloppenburg & Yap 2010
19. **Hoya recurvula** Kloppenburg 2000
20. **Hoya sp.** ABG #12 NG
21. **Hoya juannguoana** Kloppenburg 2002
22. **Hoya sp.** DAV 819
23. **Hoya erythrina** Rintz 1978
24. **Hoya nagtabonensis** Kloppenburg
25. **Hoya vitellinia** Blume 1849
26. **Hoya citrina** Ridley 1922
27. **Hoya neoebudica** Guillaumin 1937
28. **Hoya matavanuensis** Kloppenburg 2011
29. **Hoya deykeae** Green 1999 Type clone
30. **Hoya querinoensis** Kloppenburg & Siar 2007
31. **Hoya shephardii** Short ex Hooker 1861
32. **Hoya purificacionae** Kloppenburg & Siar
33. **Hoya sp.** USDA 354241
34. **Hoya surigaoensis** Kloppenburg, Simeona V. Siar & Torill Nyhuus 2010
35. **Hoya sp. diversifolia 1981 Bogor**
36. **Hoya cardiophylla** Merrill 1920
37. **Hoya sp.** Here (UC) 1013 Colon (cardiophylla)
38. **Hoya benvergarai** Klopp. & Siar 2008
39. **Hoya graveolens** Kerr 1939
40. **Hoya isabelaensis** Kloppenburg, Siar & Ferreras 2011
41. **Hoya soligamiana** Kloppenburg & Siar 2009
42. **Hoya lambii** Green 2000
43. **Hoya xxxxxxxx** Kloppenburg & M. V. Siar

44. **Hoya pentaphlebia** Merrill 1918
45. **Hoya cagayanensis** Burton 1987
46. **Hoya butleriana** Kloppenburg, Siar, Guevarra & Carandang 2013
47. **Hoya aurigueana** subsp. *altocolora* Kloppenburg & Mendoza
48. **Hoya elsae** Kloppenburg & Mendoza
49. **Hoya marionii** Kloppenburg & Mendoza
50. **Hoya perangensis** Kloppenburg & Siar
51. **Hoya marsianii** Kloppenburg & Mendoza
52. clone 910301 collected by Blass Hernaez
53. **Hoya cf. fitchii** vial #20
54. **Hoya blashernaezii** ssp. *valmayoriana* Klopp., Guev., & Carandang 2014
55. **Hoya crassicaulis** Elmer ex Kloppenburg 1995
56. **Hoya palawanensis** subsp. **majora** Kloppenburg, Siar, Mendoza 5297
57. **Hoya palawanensis** subsp. **majora** Klopp., Siar, et al. 2012
58. **Hoya makatongensis** Kloppenburg & Mendoza
59. **Hoya marlowei** subsp. *infantaensis* Kloppenburg & Mendoza
60. **Hoya benvergarae** Kloppenburg & Siar 2008
61. **Hoya benvergarai** subsp. *gelba* Kloppenburg & Mendoza
62. **Hoya linapauliana** Kloppenburg, Siar & Mendoza
63. **Hoya linapauliana** subsp. *verida* Kloppenburg, Siar, Cajano
64. **Hoya linapauliana** subsp. *nakarensis* Kloppenburg & Mendoza
65. **Hoya palawanensis** Kloppenburg, Siar & Mendoza 2015
66. **Hoya palawanensis** subsp. *minora* Kloppenburg 2015
67. **Hoya** sp. 2012-4-029
68. **Hoya** sp. 900355
69. **Hoya cajanoae** Kloppenburg
70. **Hoya aurigueana** Kloppenburg, Siar & Cajano 2013
71. **Hoya lagunaensis** Kloppenburg 2015
72. **Hoya cagayanensis** Burton 1987
73. **Hoya incrassata** Warburg 1904
74. **Hoya forbesii** King & Gamble 1903
75. **Hoya auripigmenta** Kloppenburg & Mendoza
76. **Hoya benstoneana** Klopp., Siar, Mendoza, Guevarra & Carandang 2013
77. **Hoya marizae** Kloppenburg & Mendoza
78. **Hoya persicina** subsp. *rosea* Kloppenburg, Mendoza & Ferreras 2013
79. **Hoya crassicaulis** subsp. *mendozae* Kloppenburg
80. **Hoya persicina** subsp. *inawaensis* Kloppenburg & Mendoza
81. **Hoya auripigmenta** subsp. *papillata* Kloppenburg & Mendoza
82. **Hoya cardiophylla** Merrill 1920
83. **Hoya velasioii** subsp. **grandiora** Kloppenburg 2015
84. **Hoya bicolor** subsp. *polilloensis* Kloppenburg & Mendoza
85. **Hoya alwitriana** Kloppenburg, Siar, Guevarra & Carandang 2012
86. **Hoya aurantiaca** ssp. *lagyoensis* Kloppenburg & Mendoza
87. **Hoya bakyaanensis** Kloppenburg & Mendoza
88. **Hoya** sp. EG 06097
89. **Hoya latifolia** ?

90. ***Hoya armeniaca*** Kloppenburg & Mendoza

Hoya pubicorolla subsp. anthracina Kloppenburg, Ferreras &
Mendoza 2013



Pollinarium enlarged
ca. 180x.

Pollinium

length 0.83 mm
widest 0.20 mm

Retinaculum

length 0.26 mm
shoulder 0.20 mm
waist 0.10 mm
hip 0.16 mm
ext. 0.05 mm

Translator

length 0.10 mm
depth 0.03 mm

Caudicle

bulb diam. 0.08 mm

Translator/Caudicle
Type: d/o

Pollinia apex type: R

Caudicle bulb: G

Retinacula
character: S

Ratios: p/w 4.2
p/r 5.2

Flowers in globose clusters of ca. 28 flowers.

Hoya davaoensis Kloppenburg 2013

Pollinaria

Pollinium

length	0.80 mm
widest	0.25 mm

Retinaculum

length	0.20 mm
shoulder	0.15 mm
waist	0.10 mm
hip	0.12 mm
ext.	0.03 mm

Translators

length	0.15 mm
depth	0.04 mm

Caudicle

bulb diam.

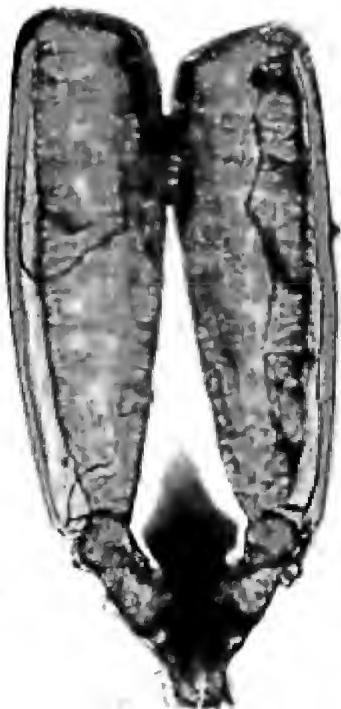
Translator/caudicle type: d/o

Pollinia end type: RT

Retinacula character: S



Hoya fuscomarginata N. E. Brown 1901



Pollinarium enlarged about 82x.

Pollinia

length	0.75 mm
widest	0.17 mm

Retinaculum

length	0.17 mm to the extensions
shoulder	0.10 mm
waist	0.05 mm
hips	0.09 mm
extensions	0.05 mm

Translator

length	0.08 mm
width	0.02 mm
depth	0.04 mm

Caudicle

bulb diameter 0.06 mm

Translator/caudicle type: d/o

Pollinia end type: RT

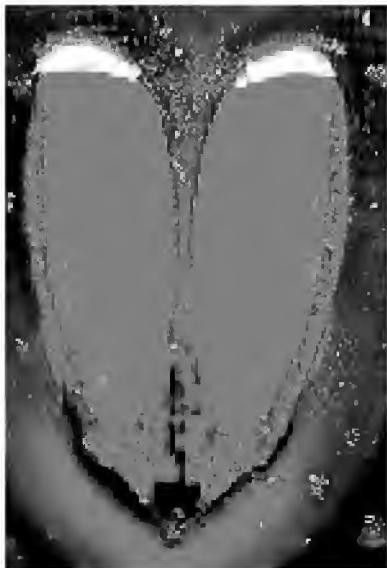
Caudicle bulb: G

Retinacula character: HE

There is a little indent in the retinacular shoulder, head tapers from the shoulder to a point (coolie hat fashion), extensions are rather long and heavy.

Hoya pachyclada Kerr 1939

Flower from clone 574 flowered in Fresno, CA. USA.



translators are fairly uniform in width and attached at the waist area supporting rather small caudicles; they extend down to cover the sides of the hip area. The head portion of the dark retinaculum is rather long and the shoulder fairly prominent.

Pollinia

length	0.75 mm
widest	0.28 mm uniform width, pellucid
edge from top to inner	apex with little or no vacuole visible, apex rounded evenly.

Retinaculum

length	0.35 mm
shoulder	0.15 mm
waist	0.07 mm
hip	0.13 mm
extensions	0.06 mm

Translators

length	0.21 mm
depth	0.02 mm

Caudicle

bulb diameter 0.10 mm

Translator/caudicle type: d/o

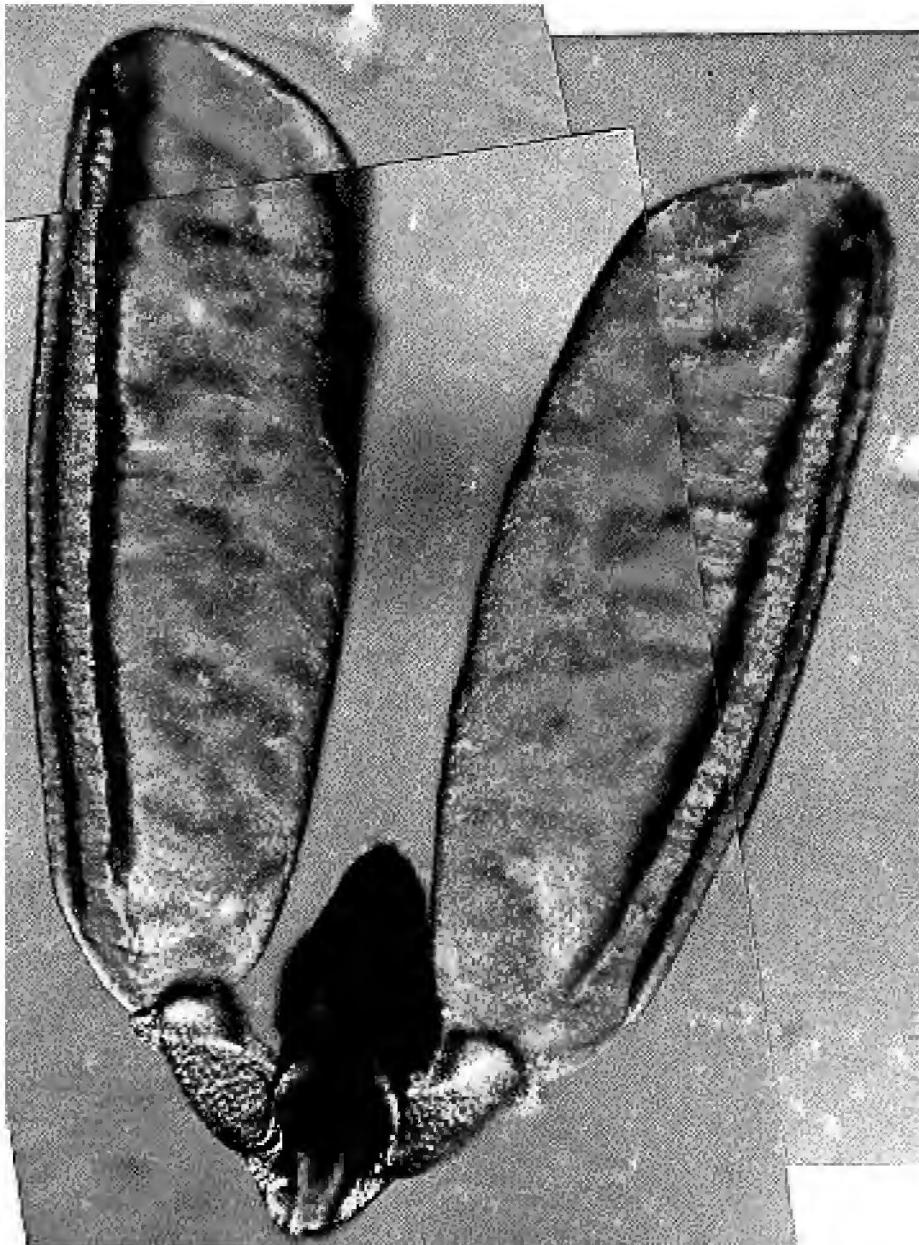
Pollinia end type: R

Caudicle Bulb: G

Retinacula character: HE

Hoya as finlaysonii Wight 1834

From Chanin Thorut collected in S. Thailand Flowered in Fresno CA June 2000



This is a composite of 3 pictures of a pollinaria enlarged about 165x. Upper left a little out of alignment. This shows the smoothly rounded apices f the pollinia. Details of the pellucid edge and vacuoles are plainly visible, as is the small portion of the nearer apex attached to the caudicle. The translators here are strongly structured and both these and caudicles are attached well down on the retinacula which has a tendency to make the retinaculum swivel on this axis.

Pollinaria: large and well developed, translators and caudicle attached well down on the long retinaculum.

Pollinia:

length	0.75 mm
width	0.26 mm

Retinaculum

length	0.27 mm
shoulders	0.18 mm
hip	0.10 mm

Translator

length	0.16 mm
widest	0.06 mm

Caudicles

bulb diam.	0.07 mm
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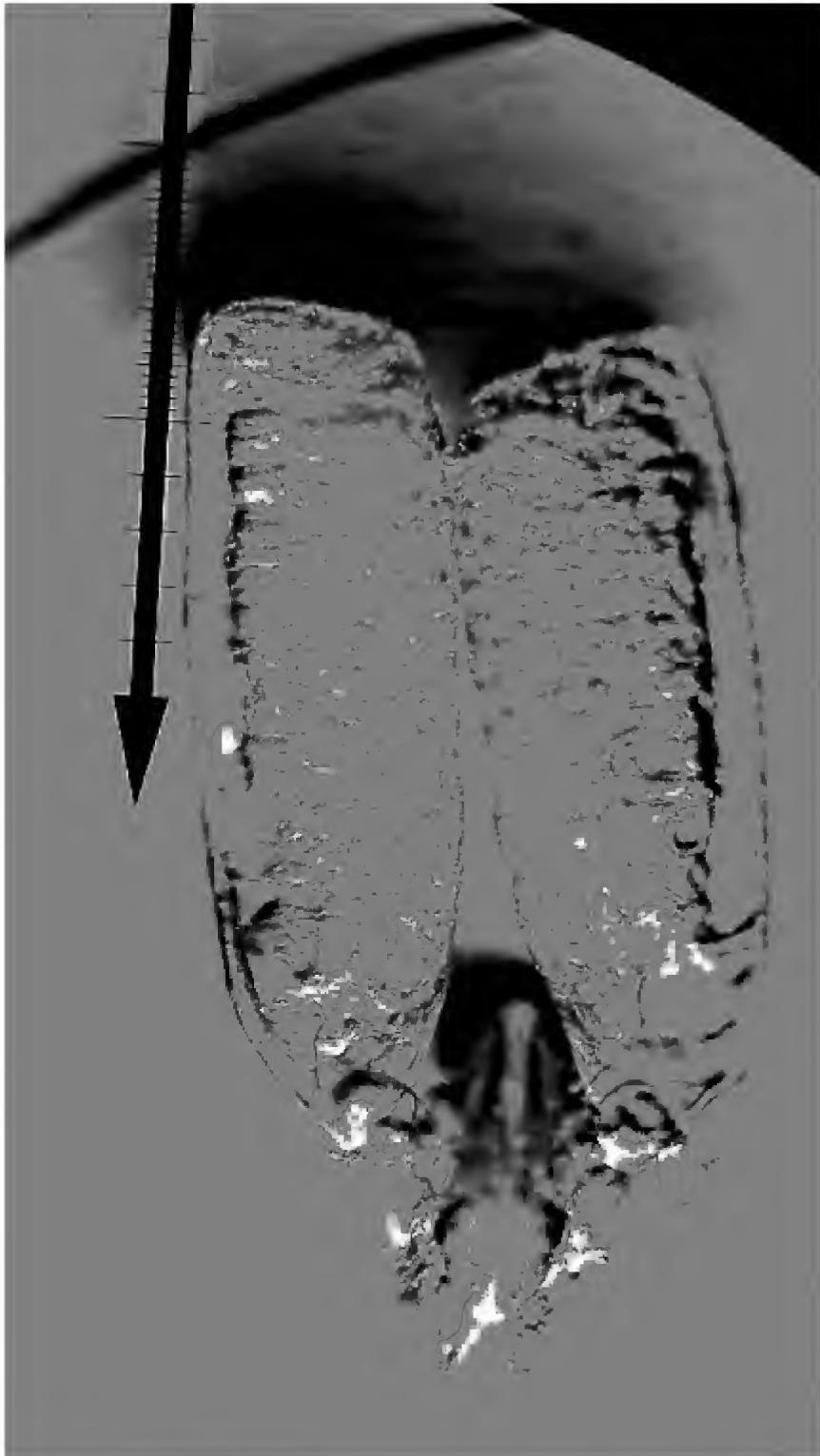
Translator/caudicle type: d/o

Pollinia end type: T

Caudicle Bulb: G (granulate)

Retinacula character: HE

Hoya pseudorigida Kloppenburg, Siar,
(unpublished)



Pollinarium enlarged
ca. 150x.

Pollinium
length 0.75 mm.
widest 0.25 mm.

Retinaculum
length 0.25 mm.
shoul. 0.19 mm.
waist 0.10 mm.
hip 0.12 mm.
ext. 0.06 mm

Translator
length 0.10 mm.
wide 0.04 mm.

Caudicle
B diam. 0.08 mm.

Translator/caud.:
d/o

Pollinium
length/width ratio
3.1

length/ret length
2.8

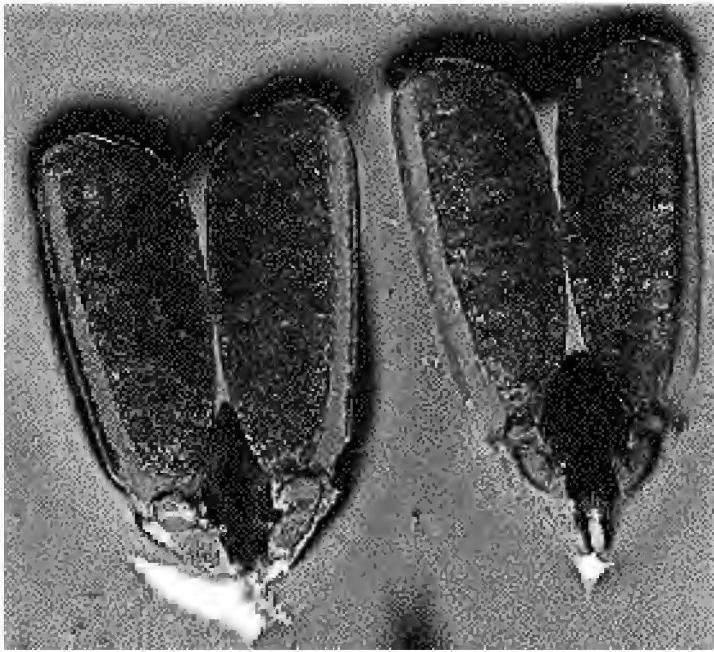
Pollinia end type:
RF

Caudicle Bulb: C

Retinacula
character: HE

***Hoya cinnamomifolia* Hooker 1848**

Flower via Ann Wayman, Central Point, OR. USA.



The one on the left is a bottom view and the right one a top view, both are pretty much the same except for what is visible of the retinaculum. This shows that the structure is dimensional. the left one shows the translators and the caudicle entering the side cavities in the low waist areas. And the head here appears elongated. In order to study Pollinarium, one must make comparisons of the same view of all Pollinaria And focus up and down to determine their true structure. Nearly all my

photos are of the top view of the retinaculum for comparative purposes. The bulbous caudicles are plainly visible on the left subject.

Pollinium

length	0.72 mm
widest	0.27 mm long fairly large vacuole inside from the sterile pellucid edge.

Retinaculum

length	0.30 mm to crotch, hear rounder on top.
shoulders	0.20 mm wide.
waist	0.12 mm wide
hips	0.22 mm

Translator

length	0.17 mm
depth	0.05 mm thickest near base.

Caudicle

bulb. diam.	0.08 mm.
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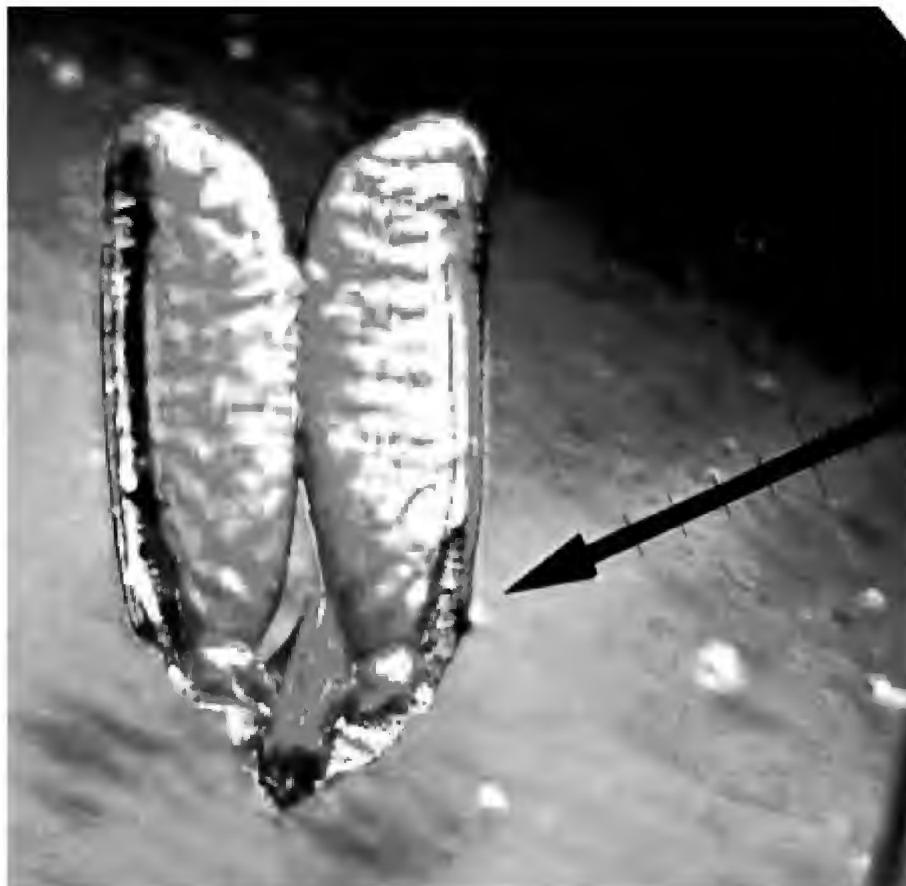
Translator/caudicle type: d/o

Retinacula character: HE

Pollinia inner end type: RT

Caudicle bulb: G

Hoya paulshirleyi Kloppenburg & Green 2010



Pollinium
enlarged about
165x.

Pollinium

length	0.71 mm
widest	0.20 mm

Translator/caudicle type: d/o

Retinaculum

length	0.18 mm
shoulder	0.12 mm
waist	0.05 mm
hip	0.09 mm
ext.	0.02 mm

Pollinia inner end type: RT

Caudicle bulb: G

Retinacula character: HE

Translators

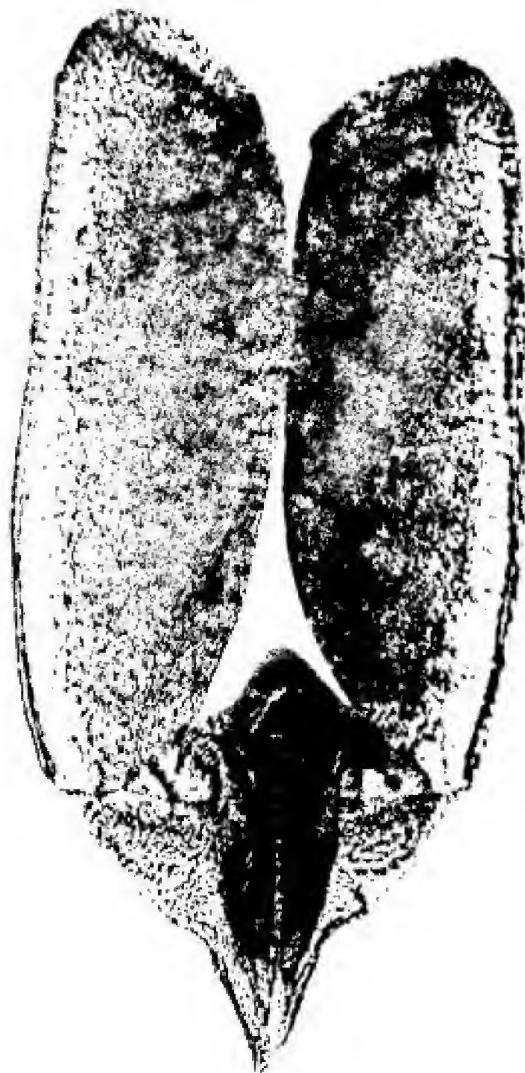
length	0.10 mm
width	0.05 mm
depth	0.01 mm

Caudicle

bulb diam.	0.07 mm
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Hoya sp. shephardell
Grown and flowered in Fresno, CA.

Magnified approximately 165x.



Retinacula character: S

Pollinium

length:	0.65 mm
widest:	0.21 mm

Retinaculum

length:	0.24 mm
shoulder:	0.15 mm
waist:	0.08 mm
hip:	0.10 mm
ext.:	0.06 mm

Translators

length:	0.14 mm
depth:	0.02 mm

Caudicle

bulb. diam.:	0.06 mm
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Translator/caudicle type: d/o

Pollinia inner end type: RT

Caudicle bulb: G

Hoya sp. 80-03 Borneo

Flower via MM.



Magnified approximately 165x.

Pollinium

length:	0.65 mm
widest:	0.21 mm

Retinaculum

length:	0.14 mm
shoulder:	0.14 mm
waist:	0.08 mm
hip:	0.12 mm
ext.:	0.04 mm

Translators

length:	0.12 mm
depth:	0.03 mm

Caudicle

bulb. diam.:	0.07 mm
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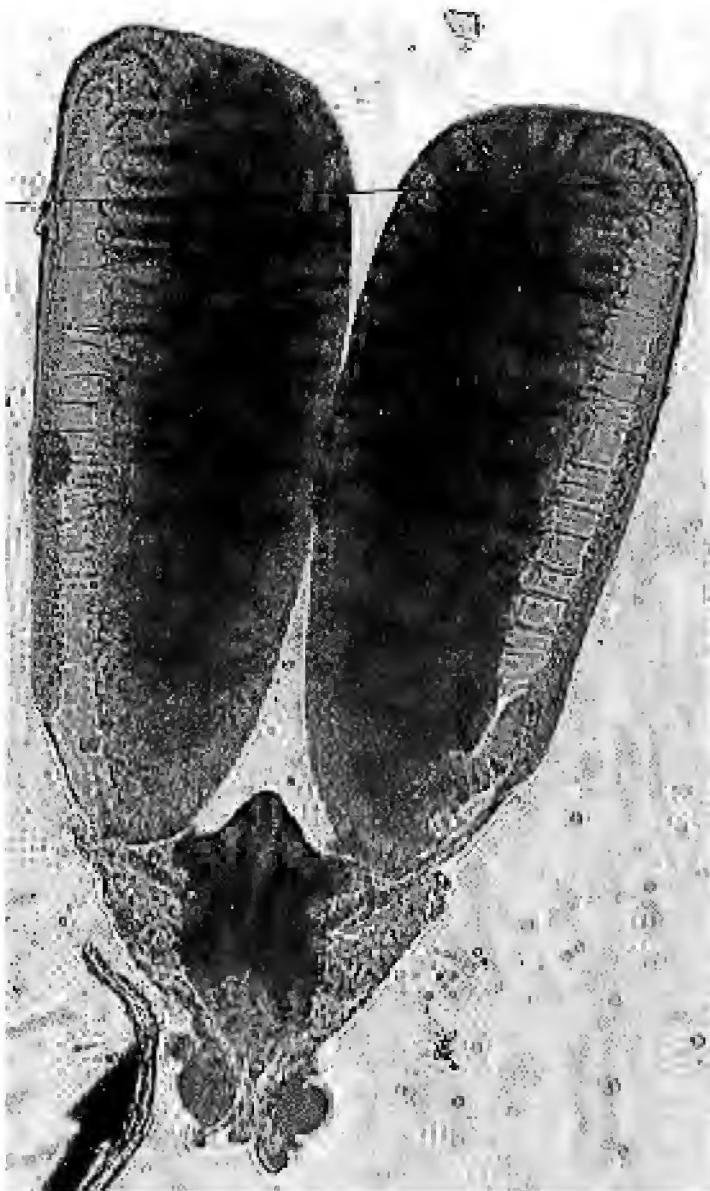
Translator/caudicle type: d/o

Pollinia inner end type: R (round)

Caudicle bulb: G

Retinacula character: R

Hoya sp. USDA 354238
Grown and flowered in Fresno, CA



The pollinarium enlarged about 165x. This is a large pollinarium. The pellucid edge starts over the top of the pollinia and runs down the outside edge but not clear to the inner apex. There is a distinct vacuole, fairly wide just inside from this edge. The translators are broad and well developed supporting relatively small clear caudicles. The retinaculum is broad and short.

Pollinia

length	0.64 mm
width	0.26 mm

Retinaculum

length	0.19 mm
shoulder	0.14 mm
waist	0.07 mm
hip	0.09 mm
extensions	0.06 mm

Translators

length	0.12 mm
depth	0.06 mm

Caudicle

bulb diameter	0.06 mm
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Translator/caudicle type: d/o

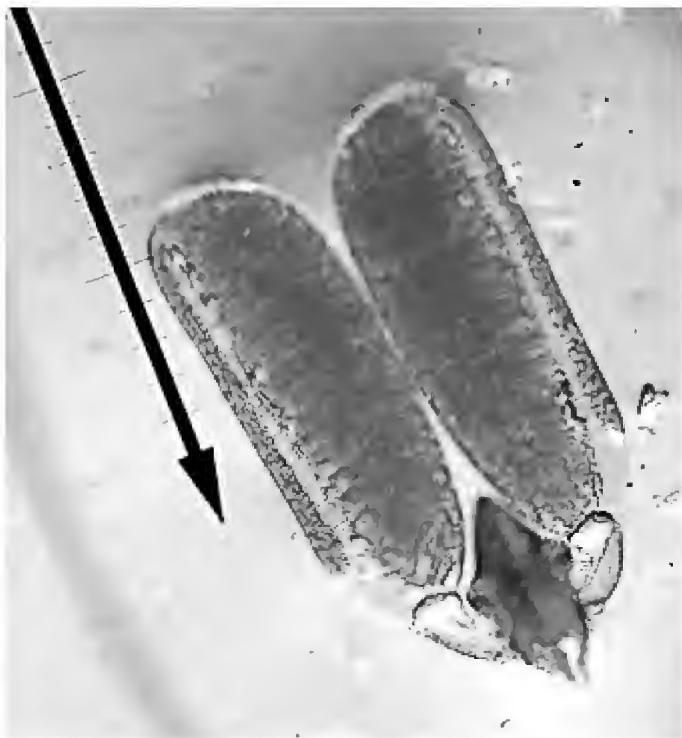
Pollinia inner end type: R

Caudicle bulb: G

Retinacula character: S

Hoya sp. NS05-162

Flowers in Kew solution from Torill Nyhuus June 2007, data 27 June 2007



Pollinaria enlarged about 125x.

Pollinium

length	0.63 mm
widest	0.22 mm

Retinaculum

length	0.21 mm
shoulder	0.14 mm
waist	0.07 mm
hip	0.10 mm
ext.	0.08 mm

Translator

length	0.12 mm,
depth	0.03 mm
wide	0.01 mm

Caudicle

bulb diam	0.06 mm
clear	

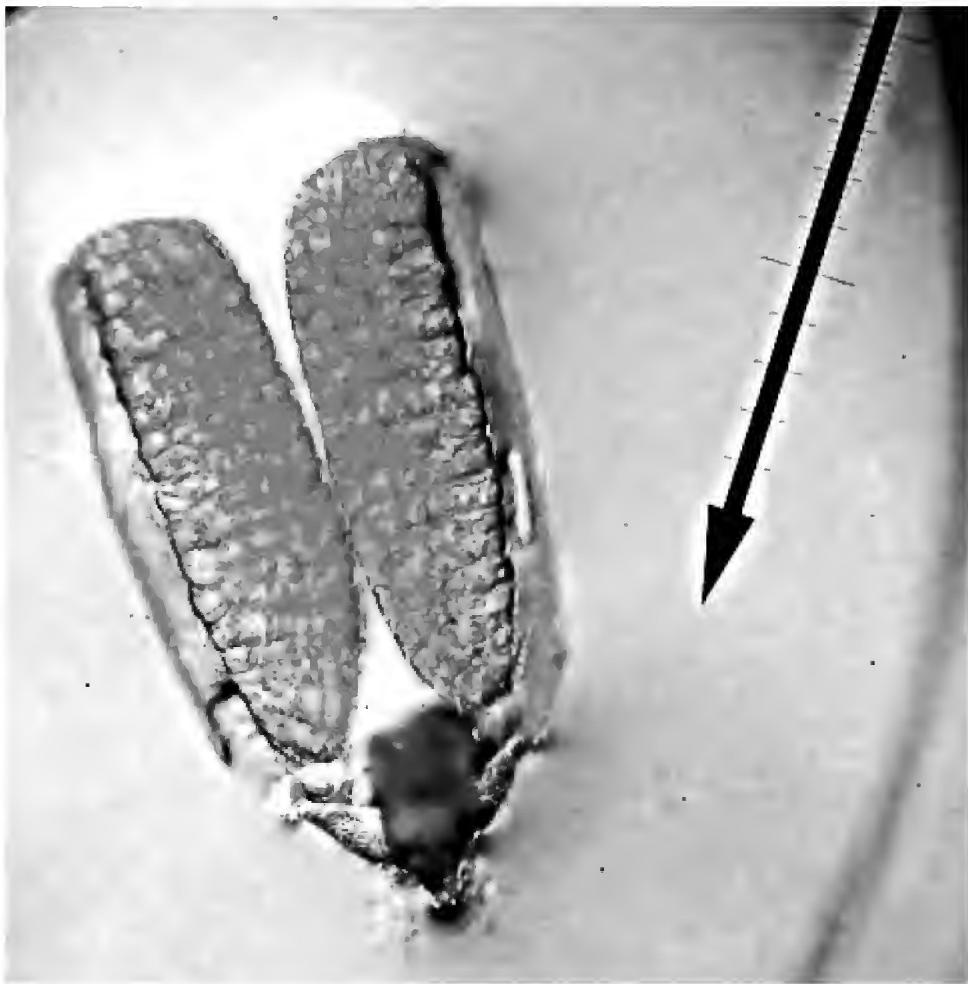
Translator/caudicle type: d/o

Pollinia inner end type: RT

Caudicle bulb: G

Retinacula character: HE

***Hoya ubudensis* Kloppenburg & Yap 2010 Type clone**



Pollinaria
enlarged ca.
165x to
show more
detail of the
translator
type.

Pollinium		Translator/caudicle type: d/o
length	0.60 mm	
widest	0.21 mm	Pollinia end type: R

Caudicle bulb: 0.05 mm

Ratio: pollinium length/ret. 2.8

Ratio: pollinium length/width 2.8

Delta shaped, surface granulate.

Retinaculum

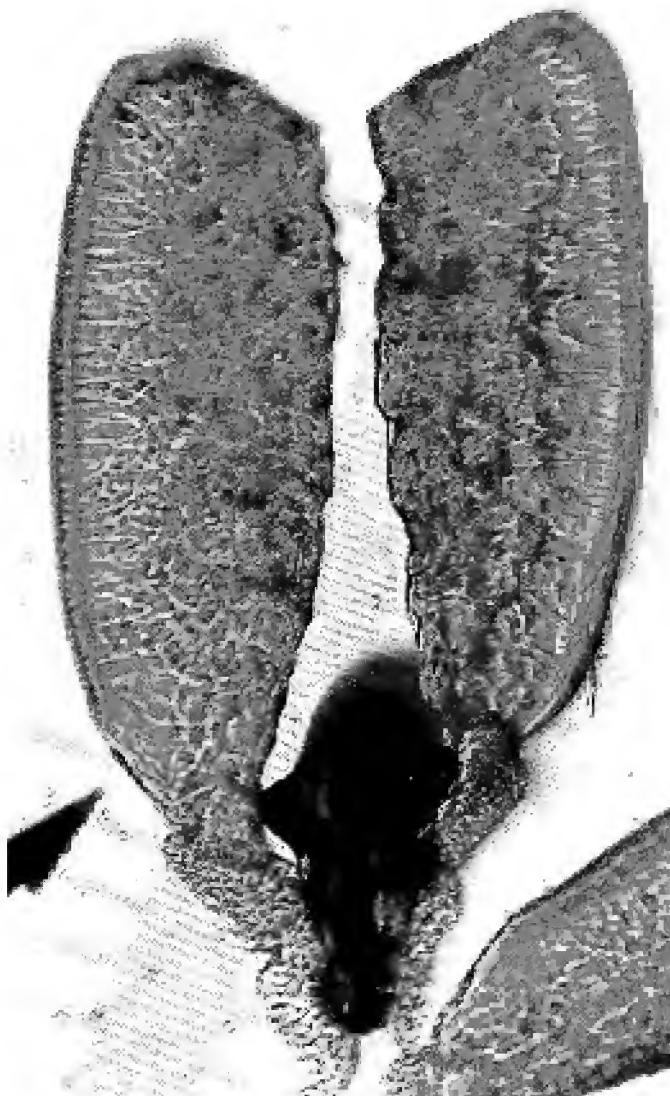
length	0.16 mm
shoulder	0.11 mm
waist	0.06 mm
hip	0.08 mm
ext.	0.05 mm

Translator

length	0.10 mm
deepest	0.05 mm

Hoya wibergiae Kloppenburg 2001

Plant grown and flowered in Fresno, CA. USA.



Pollinarium enlarged about 165x.

The jagged edge on the inner side of the pollinia may be due to drying. The pellucid edge here begins well in on the top of the pollinia at the division between the vacuoles and pollen and seems to extend all the way to the other apex. The translators are wedge shaped, not well defined, whereas the caudicle, usually clear, is here more opaque and relatively small. The retinaculum is large with a rounded hear broad shouldered and tapers to the apex from there with extensions not well separated.

Pollinarium:

Pollinia

length	0.60 mm
widest	0.21mm

apex truncate but tapering inwardly.

Pellucid edge extending from outer apex to near the inner apex, vacuoles not well defined.

Retinaculum:

head domed	0.23 mm long.
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shoulders	0.15 mm wide
-----------	--------------

waist	0.10 mm wide
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hip	0.11 mm
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extensions narrowing to sharp apex, close together.0.08 mm. long with much undifferentiated material.

Translators wedge shaped.

length	0.15 mm
--------	---------

widest	0.05 mm
--------	---------

attached below waist.

Caudicle dense (not clear)

bulb ca.	0.6 mm in diameter.
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Translator/caudicle type: d/o

Pollinia inner end type: F

Caudicle bulb: G

Retinacula character: R

Hoya betchei (Schltr.) Whistler

May be correct but retinacula large. W344

Collected by Dr. Whistler, 12 July 1980, elev. 550m Upolu, Samoa



Pollinarium enlarged about 165x. I could not get the whole structure together.

Pollinium

length	0.60 mm
widest	0.25 mm

Retinaculum

length	0.29 mm
shoulders	0.20 mm
waist	0.09 mm
hip	0.15 mm
extensions	0.07 mm

extensions are undifferentiated.



Use the dark arrow as a reference for size. The head is 0.1 mm long, base 0.05 mm wide and stem is 0.02 mm. wide. Species with retinacula this long are *H. imperialis*, *H. thompsonii*, & *H. cinnamomifolia*; they are in the upper range of sizes. The length is from the top of the head to the crotch where the extensions begin.

Translator/caudicle type: d/o

Pollinia inner end type: T

Caudicle bulb: G

Retinacula character: HU

H. betchei (Schltr.) Whistler.

Hoya recurvula Kloppenburg 2000



A view of the pollinarium enlarged about 165x.

Pollinaria: Very long rather narrow pollinia, outer apex rounded and tapering inward.

Pellucid margin on outside with a small tapering vacuole. Retinacula large, heavy thick translators and small amber nearly clear caudicles.

Pollinia

length	0.59 mm
widest	0.25 mm

Retinacula

length	0.25 mm
shoulders	0.12 mm
hip	0.09 mm
waist	slightly wider

Translators

length	0.13 mm
depth	0.07 mm granular surface.

Caudicle

bulb diam.	0.05 mm
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Translator/caudicle type: d/o

Pollinia inner end type: RT

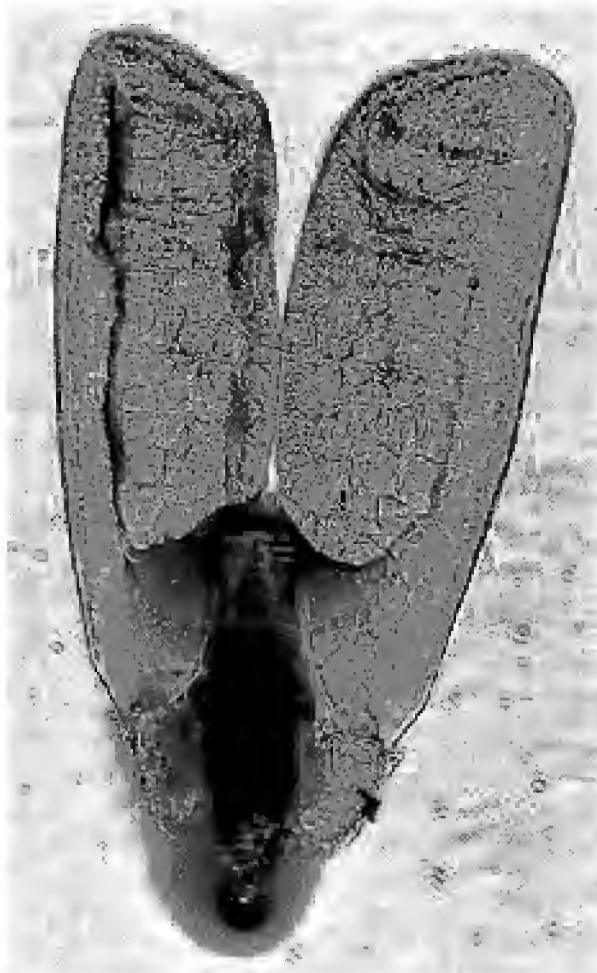
Caudicle bulb: G

Retinacula character: R

Hoya sp. IPPS 7020

Flowers via Ted Green, possibly *Hoya vitellinoides* Brink f.

If the type sheet material I received from Chris Burton (see under *Passport to Hoya vitellinoides*) is correct then I do not think this identification is correct but must be related see the pollinaria of all.



View of the pollinarium enlarged about 165x. The pollinia here are rather broad. Much shorter than in the type material for *H. vitellinoides* Bakh, f. Notice the sort of unconsolidated pollen in the lower ends and what appears to be very broad vacuoles. The retinaculum head is rather long and narrow. Translators appear to be attached well down on the retinaculum.

Pollinium

length:	0.58 mm
widest:	0.20 mm

Retinaculum

length:	0.25 mm
shoulder:	0.12 mm
waist:	0.07 mm
hip:	0.08 mm
ext.:	0.08 mm

Translators

length:	0.13 mm
depth:	0.02 mm

Caudicle

bulb. diam.:	0.04 mm
possibly opaque granulate	

Translator/caudicle type: d/o

Pollinia inner end type: RT

Caudicle bulb: G

Retinacula character: HU



Hoya sp. ABG #12 NG

Flowered in Fresno, CA.



Magnified approximately 165x.

Pollinium

length	0.58 mm
widest	0.22 mm

Retinaculum

length	0.22 mm
shoulder	0.12 mm
waist	0.07 mm
hip	0.11 mm

Translators

length	0.10 mm
depth	0.04 mm

Caudicle

bulb diam.	0.06 mm
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Translator/caudicle type: d/o

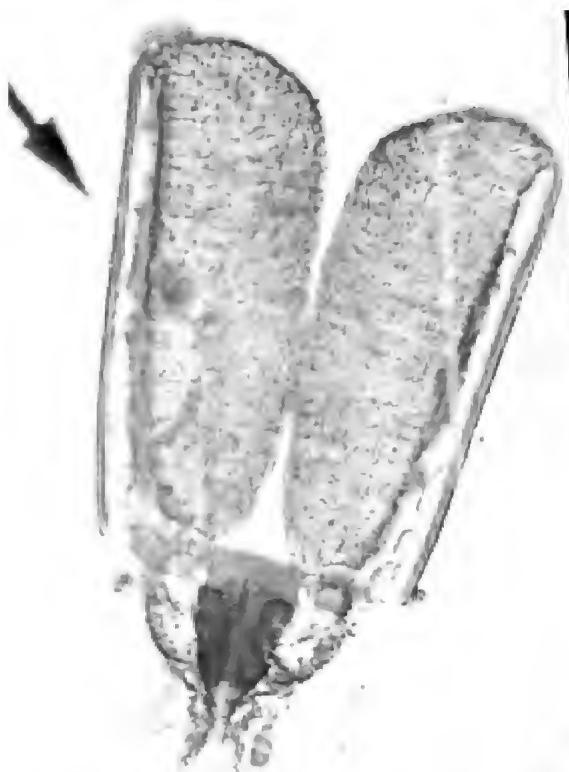
Pollinia inner end type: R

Caudicle bulb: C

Retinacula character: HE

Note the pollinaria is similar to H. sp. USDA 354238 but somewhat smaller.

Hoya sp. Ben Vergara, #56



Pollinarium enlarged about 165x

Pollinium

length	0.57 mm.
widest	0.23 mm.

Retinaculum

length	0.12 mm.
shoulder	0.10 mm.
waist	0.04 mm.
hip	0.08 mm.
ext.	0.06 mm.

Translators

length	0.12 mm.
widest	0.04 mm,

Caudicle

bulb diam.	0.05 mm.
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A little sharper picture of the retinaculum. Pellucid germinal edge extends over inner edge and down outside to the base but not around the apex. Outer apices are rounded tapering inward slightly.

The translators are attached below the waist.

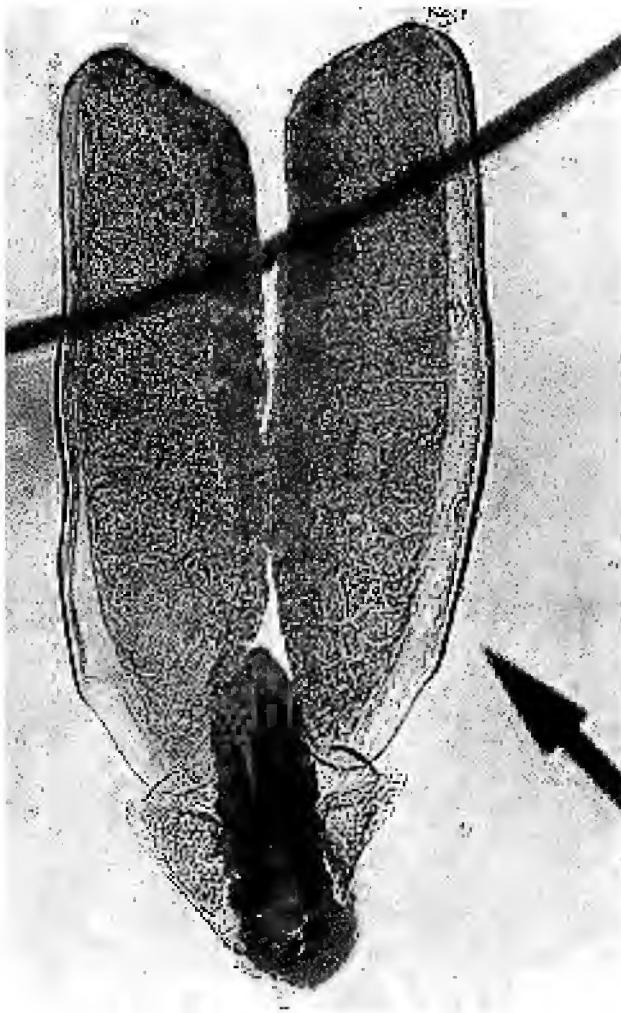
Translator/caudicle type: d/o

Pollinia inner end type: R

Caudicle bulb: C

Retinacula character: S

Hoya juannguoana Kloppenburg 2002



Pollinarium enlarged about 165x. The dark circular line is a circular area containing a 1 mm scale on the mounting slide. The arrow head in the lower right is 0.10 mm long.

Note: The dark retinaculum is rather long and narrow, translators are especially well developed, supporting a clear bulbous ended caudicle into which the lower end of the pollinia stick. The pellucid margin on the pollinia do not extend near the attached apex. outer apex of pollinia (this is the end nearest the flower center) is truncated inwardly, the vacuole is clear and devoid of extraneous material for the most part.

Pollinarium: long pollinia and narrow ends truncate; long retinaculum, well developed translator arms supporting large clear caudicle bulb.

Translator/caudicle type: d/o

Pollinia apex type: T

Caudicle bulb: G

Retinacula character: E

Pollinia:

length	0.57 mm
widest	0.16 mm

Retinaculum:

length	0.22 mm
shoulder	0.07 mm

almost same width all the way down,
slightly larger at shoulders and hips

Translators:

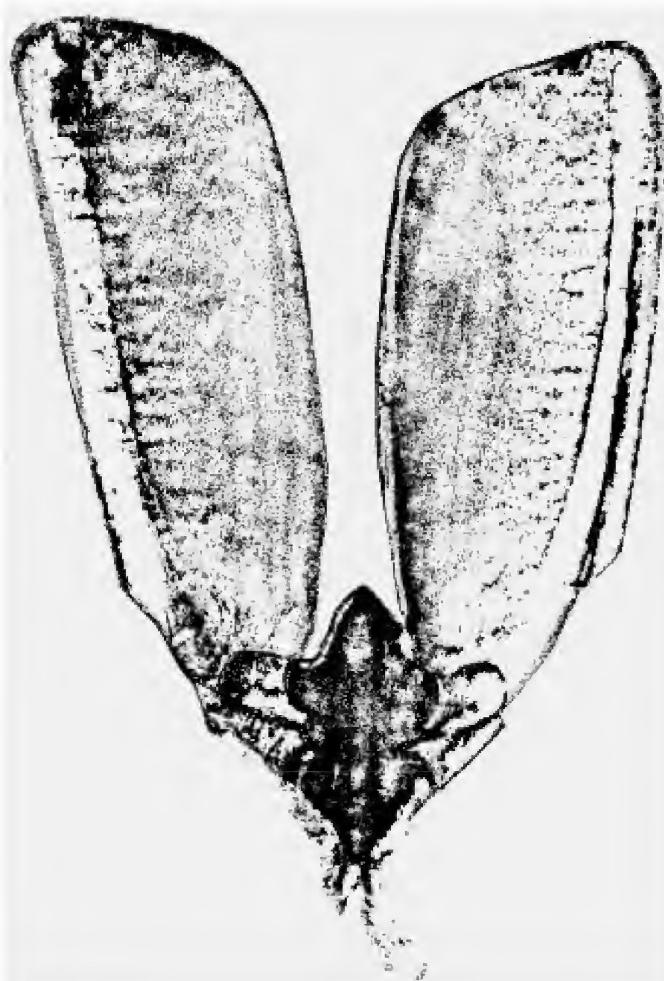
length	0.15 mm
widest	0.08 mm

Caudicles:

bulb diam.	0.07 mm
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Hoya sp. DAV 819

Reported to be *Hoya cominsii* (see comparisons above).



Magnified
approximately 165x.

Pollinium

length: 0.56-.58 mm
widest: 0.21 mm

Retinaculum

length: 0.23 mm
shoulder: 0.13 mm
waist: 0.08 mm
hip: * 0.11 mm
ext.: 0.05 mm

Translators

length: 0.08 mm
depth: 0.02 mm

Caudicle

bulb diam.: 0.05 mm

* double hips, lower one measured.

Translator/caudicle type: d/o

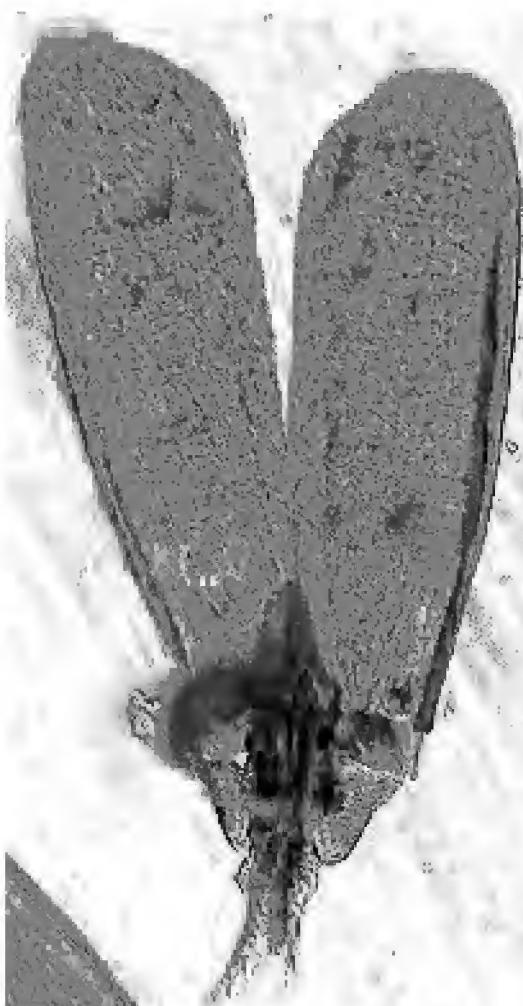
Pollinia apex type: T

Caudicle bulb: C

Retinacula character: S

***Hoya erythrina* Rintz 1978**

Flower from Ann Wayman, Central Point, OR, USA.



The pollinarium enlarged about 165x. This is a fairly large structure. Outer apices are rounded and taper slightly to the inner apex. The pellucid margin is relatively thick and narrows abruptly near the base, this is usually the point where a small orifice is found which supposedly allows nectar to enter and germinates the pollen cells. The translators are deep and broad whereas the clear caudicles are almost hidden. The retinaculum is very long and narrow with a long distance between the shoulders and the hips. The extensions are not well separated and appear rather long.

Pollinia

length	0.57 mm
widest	0.18 mm

Retinaculum

length	0.30 mm including extensions.
shoulders	0.08 mm wide.
waist	0.05 mm wide.
hip	0.09 mm wide.
extensions	0.05 mm

Translators

length	ca. 0.09 mm
widest	0.04 mm at widest portion.

Caudicle

bulb diam.	ca. 0.06 mm
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Translator/caudicle type: d/o

Pollinia apex type: RT

Caudicle bulb: G

Retinacula character: E

Hoya nagtabonensis Kloppenburg Type clone



Pollinarium enlarged about 165x.

Pollinium

length	0.56 mm
widest	0.19 mm

Retinaculum

length	0.22 mm
shoulder	0.08 mm
waist	0.06 mm
hip-1	0.10 mm
hip-2	0.08 mm
ext.	0.02 mm

Translators

length	0.10 mm
depth	0.04 mm
width top	0.02 mm

Caudicle

bulb diam.	0.05 mm
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Translator/caudicle type: d/o

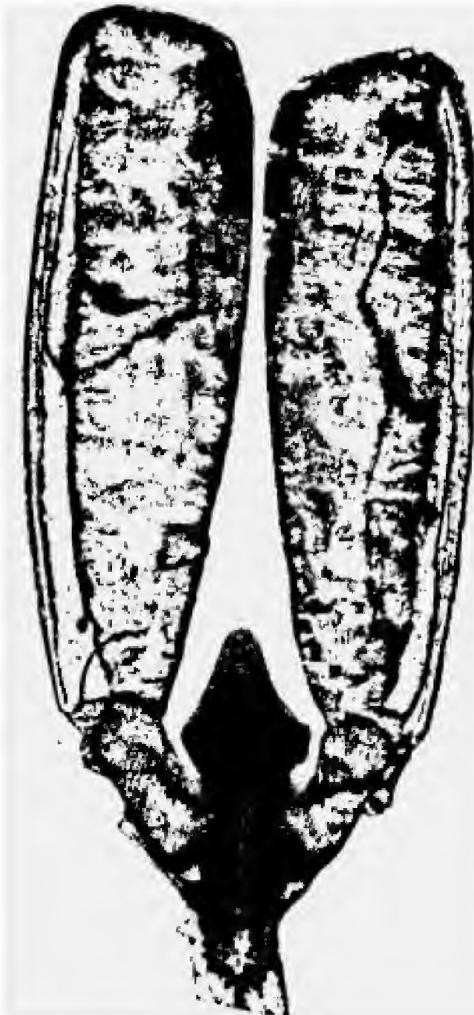
Pollinia apex type: RT

Caudicle bulb: G

Retinacula character: LS

Hoya vitellinia Blume 1849

Flower from clone labeled *H. sp. fuscomarginata*.



Magnified approximately 165x.

Pollinium

length:	0.56 mm
widest:	0.18 mm

Retinaculum

length:	0.24 mm
shoulder:	0.10 mm
waist:	0.06 mm
hip:	0.10 mm
ext.:	0.03 mm

Translators

length:	0.10 mm
depth:	0.05 mm

Caudicle

bulb diam.:	0.06 mm
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Translator/caudicle type: d/o

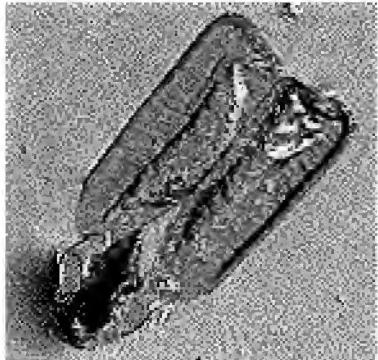
Pollinia apex type: T

Caudicle bulb: G

Retinacula character: HE

***Hoya citrina* Ridley 1922**

Grown and flowered in Fresno, CA. from a clone collected
by Dr. Chin in Central, Malaysia.



Pollinarium enlarged about 65x. Rintz's drawing depicts the leaves of this species exactly as I see them on my clone, however he has drawn the pollinia in good detail (although depicted for me in the wrong configuration) and his pollinia are rounded on the inner end. Note here that the ends are definitely squared off, more so than any other pollinia I am aware of. The translators and caudicles are well developed.

Here the pollinarium is enlarged about 165x. I see one more difference that may or may not be significant, in relation to Rintz pollinarium and that is the large vacuoles, which do not become more narrow as they proceed to the outer apex. (the attached apex). Note the well developed spatulate shaped translators and the bulbous clear caudicles, sticking to the pollinia.



Pollinium

length	0.56 mm
widest	0.18 mm

Retinaculum

length	0.23 mm
shoulder	0.12 mm
waist	0.08 mm
hip	0.10 mm
extension	0.05 mm

Translators

length	0.13 mm
depth	0.06 mm

Caudicle

bulb diam.	0.08 mm
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Translator/caudicle type: d/o

Pollinia apex type: S

Caudicle bulb: C

Retinacula character: HE

Hoya neoebudica Guillaumin 1937

Clone from Esperito Santo, Vanuatu.



Photo of a pollinarium with one pollinium not present enlarged about 165x. The pollinia here are very long, in relative terms and have an unusual inner end, sort of knobbed, and with unusually large vacuoles.

The translators are not well defined but the caudicles with their bulbous ends are readily apparent. The retinacula is well shaped.

Below are two detached pollinia, which show the unusual structure of the inner end. I believe this is structural and not developmental.

One more photomicrograph of a pollinarium enlarged about 165x. In this view the side pockets which as far as I can tell are present in all Retinacula and which actually extend up into near the center of the head area and into which the translators and caudicles extend and are attached. Caudicles and translators in various species appear to be attached along the outside edges of the retinacula at various places but actually extend into these cavities. There is a third cavity on a retinaculum which extends up the center from the lower apex between the two "legs" these cavities do not meet but are separated only by a thin wall.

Translator/caudicle type: d/o

Pollinia apex type: F

Caudicle bulb: G

Retinacula character: HE

Pollinium

length	0.56 mm
widest	0.17 mm

Retinaculum

length	0.16 mm
shoulder	0.12 mm
waist	0.06 mm
hip	0.10 mm
extensions	0.07 mm

Translators

length	0.11 mm
depth	0.03 mm

Caudicle bulb diam.

ca. 0.07 mm

Hoya matavanuensis Kloppenburg 2011
sp. W 9539 cf. diptera

Two views of the pollinaria the top one enlarged about 165x.

Pollinium

length	0.55 mm
widest	0.26 mm

Retinaculum

length	0.26 mm
shoulder	0.15 mm
waist	0.05 mm
hip	0.12 mm
extensions	0.04 mm

Translator

length	0.08 mm
depth	0.03 mm

Caudicle bulb

diameter ca. 0.08 mm

Caudicle is difficult to discern.



Description of the above herbarium sheet: *Hoya cf. diptera* Seem. 9 May 1944

Translator/caudicle type: d/o

Pollinia apex type: F

Caudicle bulb: G

Retinacula character: S

Hoya deykeae Green 1999 Type clone
Type flower via Ted Green, Kaaawa, HI. USA.



Pollinarium approx. 165x

Note: Sterile pellucid edge does not extend all the way down the outer edge of pollinia, outer ends of pollinia rounded and sloping inward. Translator with lots of round prominent coloration broadening as they extend outward. Clear caudicles extending quite a way up the base of the pollinia. Retinaculum rather long with narrowed hip area and divided outer apex Translators and caudicle seem to be attached below the waste of

Pollinium

length	0.55 mm
widest	0.16 mm

Retinaculum

length	0.32 mm
shoulder	0.09 mm
waist	0.06 mm
hip	0.10 mm
ext.	0.07 mm

Translator

length	0.10 mm
widest	0.05 mm

Caudicle

bulb diam. 0.07 mm

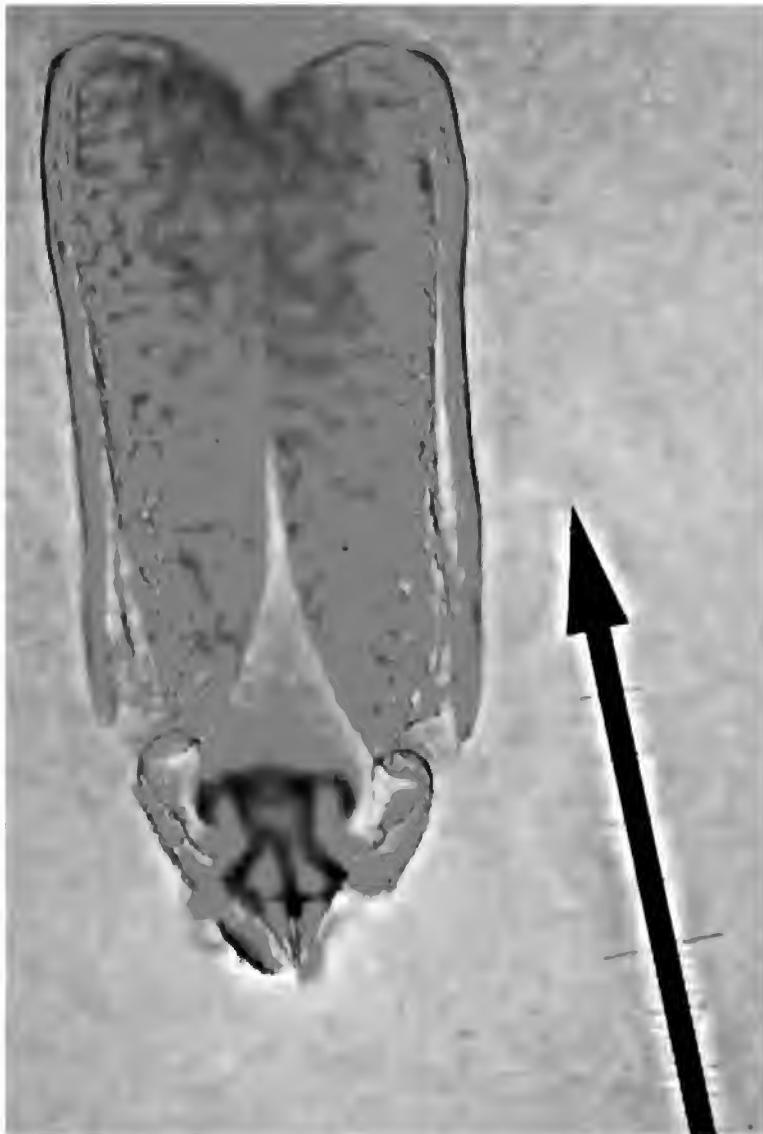
Translator/caudicle type: d/o

Pollinia inner end type: RT

Caudicle bulb: C

Retinacula character: E

***Hoya querinoensis* Kloppenburg & Mendoza**
(unpublished) GM #200



Pollinaria enlarged 160x.

Pollinium

length	0.55 mm
widest	0.19 mm

Retinaculum

length	0.13 mm
shoulder	0.14 mm
waist	0.07 mm
hip	0.12 mm
ext.	0.05 mm

Translator

length	0.12 mm
widest	0.03 mm

Caudicle

bulb diam. 0.05 mm

Translator/caudicle type:
d/o

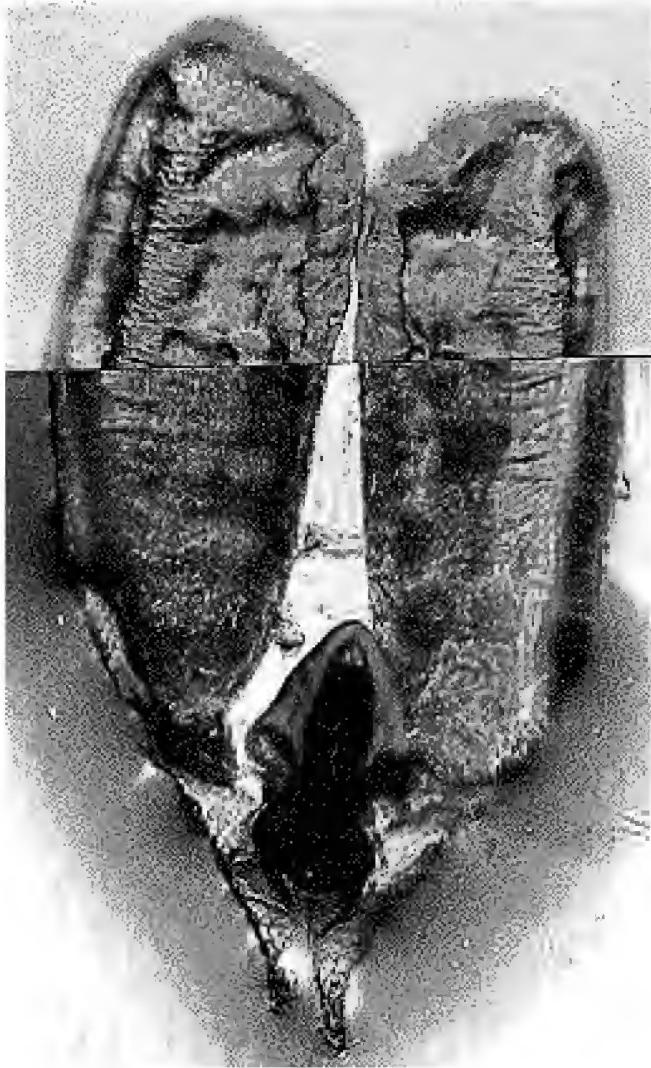
Pollinia inner end type: R

Caudicle bulb: C

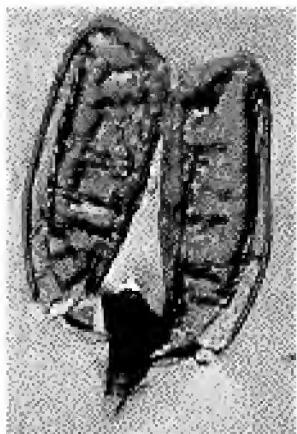
Retinacula character: S

Retinacula shoulders are rounded as are the inner pollinia ends.

***Hoya shephardii* Short ex Hooker 1861**



Pollinarium made up of two composite pictures (wouldn't fit in one frame) at 165 magnifications. The translators are relatively long, the retinaculum here is pretty well defined with a long hear portion, fairly broad and long pollinia with well developed vacuoles and pellucid edge.



Another photo of the pollinarium at a lower power, here enlarged about 65x. Note the apparent differences in the retinacula here and above, a difference only of focal length. Here the translators are more readily visible as is the well developed caudicle.

Pollinarium:

Pollinium

length 0.55 mm long.

widest 0.22 mm pellucid edge running down side to opposite the outer end, separated here by a large vacuole.

Retinaculum

length	0.22 mm long to crotch,
shoulders	0.15 mm wide
waist	0.07 mm wide
hips	0.1 mm wide
ext. short ca.	0.05 mm

Central groove well developed as well as the two side holes into the head region.

Translators

length	0.11 mm long, near retinacula
wide	0.11 mm at its base

Caudicle

bulb diam.	0.11 mm
------------	---------

Translator/caudicle type: d/o

Pollinia apex type: T

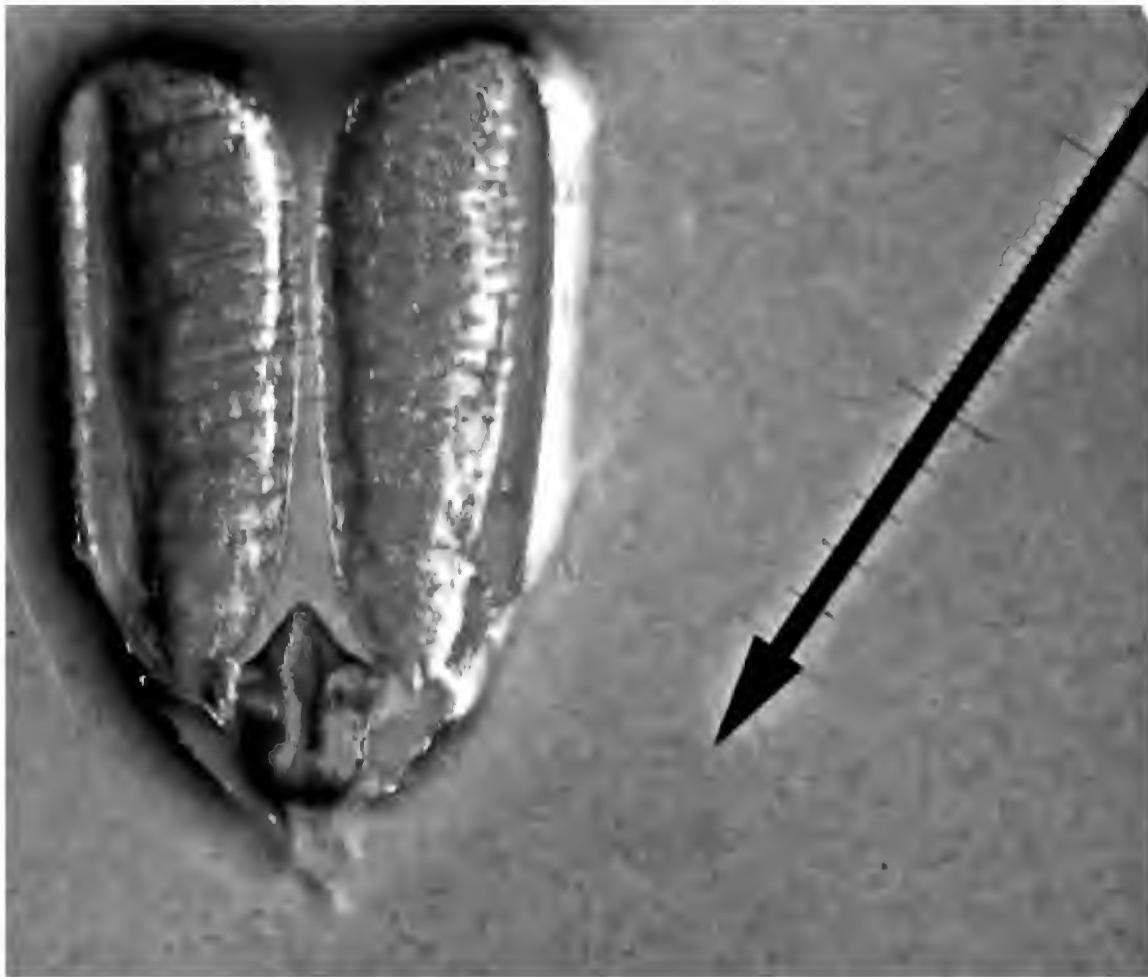
Caudicle bulb: G

Retinacula character: S

Hoya purificacioniae Kloppenburg & Siar

Sent via Monina Siar 19 March 2010, 5 flowers in small zip bag.

Plant lost



Pollinaria enlarged about 165X. Ratio: pol./width 2.3 pol./ret. 2.5

Pollinium

length	0.54 mm
widest	0.23 mm

Caudicle

Bulb diam.	0.09 mm
------------	---------

Bulb: C

Retinaculum

length	0.17 mm
shoulder	0.14 mm
waist	0.10 mm
hip	0.11 mm
ext.	0.05 mm

Translator/caudicle type: d/o

Retinacula character: S

Translators

length	0.10 mm
depth	0.04 mm

Pollinia apex type: T

Hoya sp. USDA 354241
Grown and flowered at Fresno, CA.



Magnified about
165x

Pollinium
length: 0.54 mm
widest: 0.18 mm

Retinaculum
length 0.21 mm
shoulder 0.11 mm
waist 0.06 mm
hip 0.08 mm
ext. 0.07 mm

Translators
length: 0.16 mm
depth: 0.06 mm

Caudicle
bulb. diam.: 0.07
mm

Translator/caudicle type: d/o

Pollinia apex type: R

Caudicle bulb: G

Retinacula character: HE

Hoya surigaoensis Kloppenburg, Simeona V. Siar & Torill Nyhuus
2010



The photo above is enlarged about 165x. The translator type on the pollinaria I have designated as perpendicular. Other hoya species with this type translator are; mitrata, darwinii, leucorrhoda, rigida, longifolia and others. Ratios: ret/pol.= 4.8; pol. l/w =3.7

Pollinium

length 0.53 mm
widest 0.14 mm

Retinaculum

length 0.11 mm
shoulder 0.06 mm
waist 0.03 mm
hips 0.05 mm
ext. 0.05 mm

Translator

length 0.07 mm

Caudicle

bulb diam. 0.03 mm

Type: G

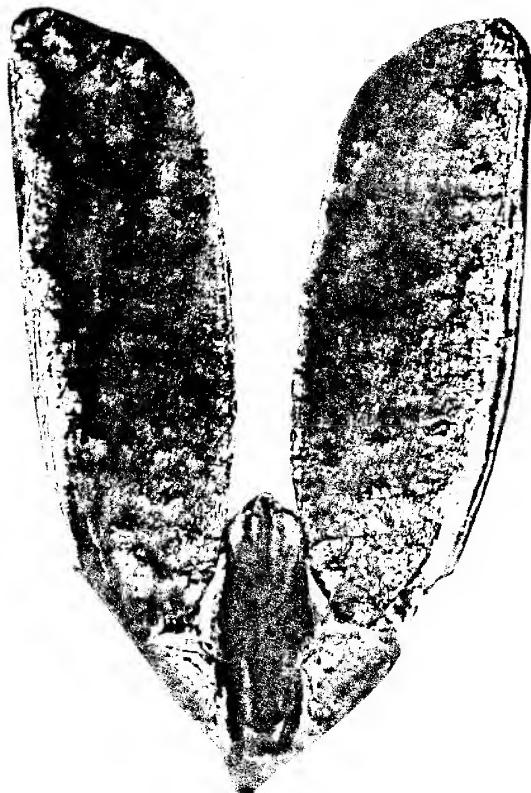
Translator/caudicle type: d/o

Pollinia end type: R

Retinacula character: S

Hoya cardiophylla Merrill 1920

Flower from clone 910302 via DH, flowered in Fresno, CA.



Pollinium

length:	0.52 mm
widest:	0.18 mm

Retinaculum

length:	0.20 mm
shoulder:	0.07 mm
waist:	0.06 mm
hip:	0.09 mm
ext.:	0.02 mm

Translators

length:	0.11 mm
depth:	0.05 mm

Caudicle

bulb. diam.:	0.08 mm
--------------	---------

Magnified approximately 165x.

Type: C

Translator/caudicle type: d/o

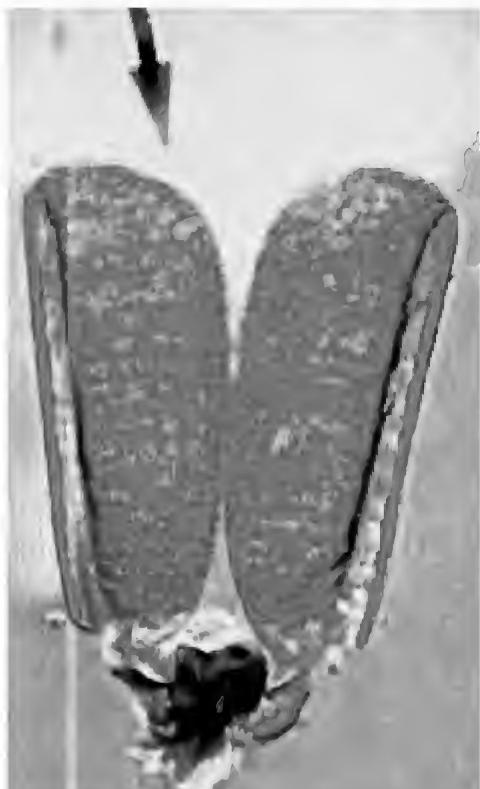
Pollinia end type: T

Retinacula character: E

Hoya benvergarai Klopp. & Siar 2008

Type clone Flowers from Monina Siar

Roll 331 10/24/05



Pollinaria enlarged about 165x.

Pollinium: with rounded inner apices, pellucid edge extends to base but not around end.

length	0.52 mm
widest	0.21 mm

Retinaculum: skewed a little so difficult to obtain precise measurements.

length	0.13 mm
shoulder	0.16 mm
waist	0.08 mm
hip	0.10 mm
ext.	0.04 mm

Translators: from waist area

length	0.10 mm
--------	---------

Caudicle:

bulb diameter 0.05 mm

Type: C

Translator/caudicle type: d/o

Pollinia apex type: R

Retinacula character: S

Hoya graveolens Kerr 1939

Collected in Thailand, by Ted Green.



Pollinarium enlarged about 165x.
The Retinaculum has a rounder head and there is a rounder flare well down on the sides just above the waist with more broadly rounded hip area. Caudicles are relatively small.

Pollinia

length	0.52 mm
widest	0.19 mm

Retinaculum

length	0.21 mm
shoulder	0.06 mm
2 nd bulge	0.08 mm
waist	0.04 mm
hip	0.06 mm
ext.	0.05 mm

Translator

length	0.07 mm
depth	0.04 mm

Caudicle

bulb diam.	0.05 mm
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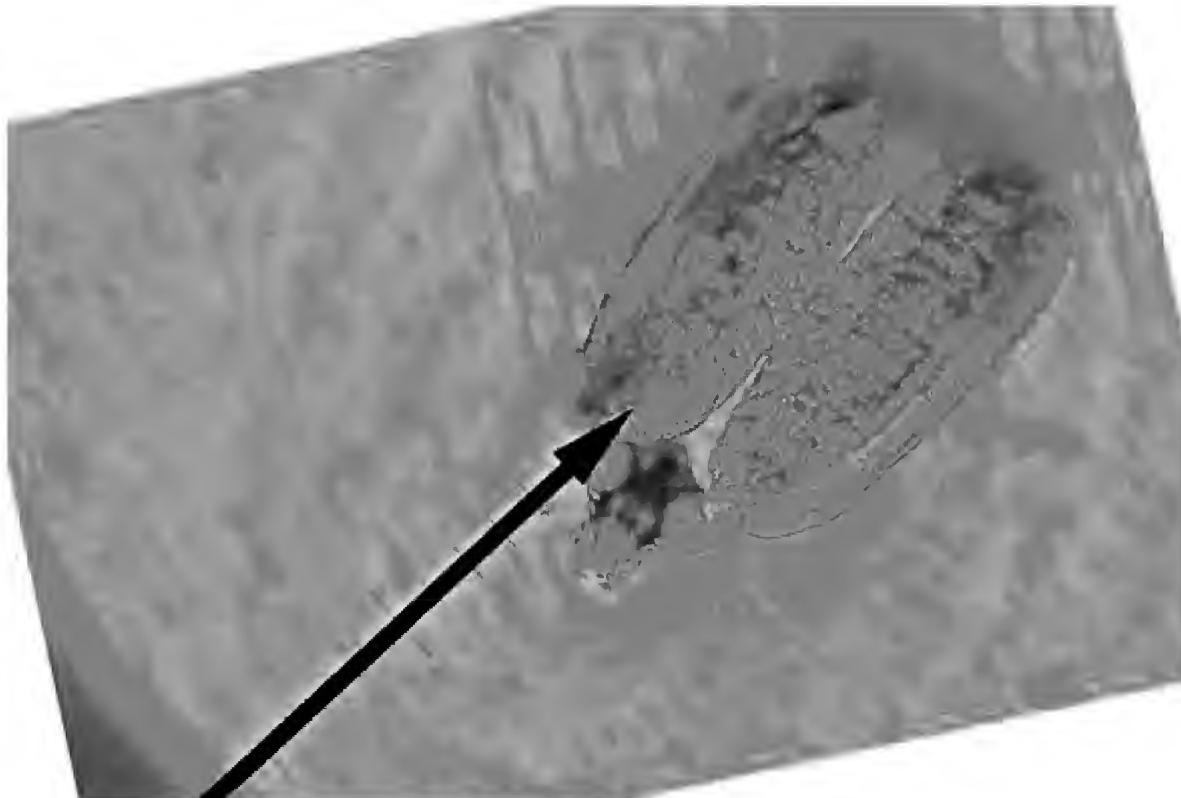
Translator/caudicle type: d/o

Pollinia apex type: R

Caudicle bulb: C

Retinacula character: E

Hoya isabelaensis Kloppenburg, Siar & Ferreras 2011



Pollinaria enlarged about 180x

Pollinium

length	0.51 mm
widest	0.20 mm

Translator

length	0.12 mm
depth	0.02 mm

Retinaculum

length	0.12 mm
shoulder	0.12 mm
waist	0.05 mm
hip	0.09 mm
ext.	0.06 mm

Caudicle

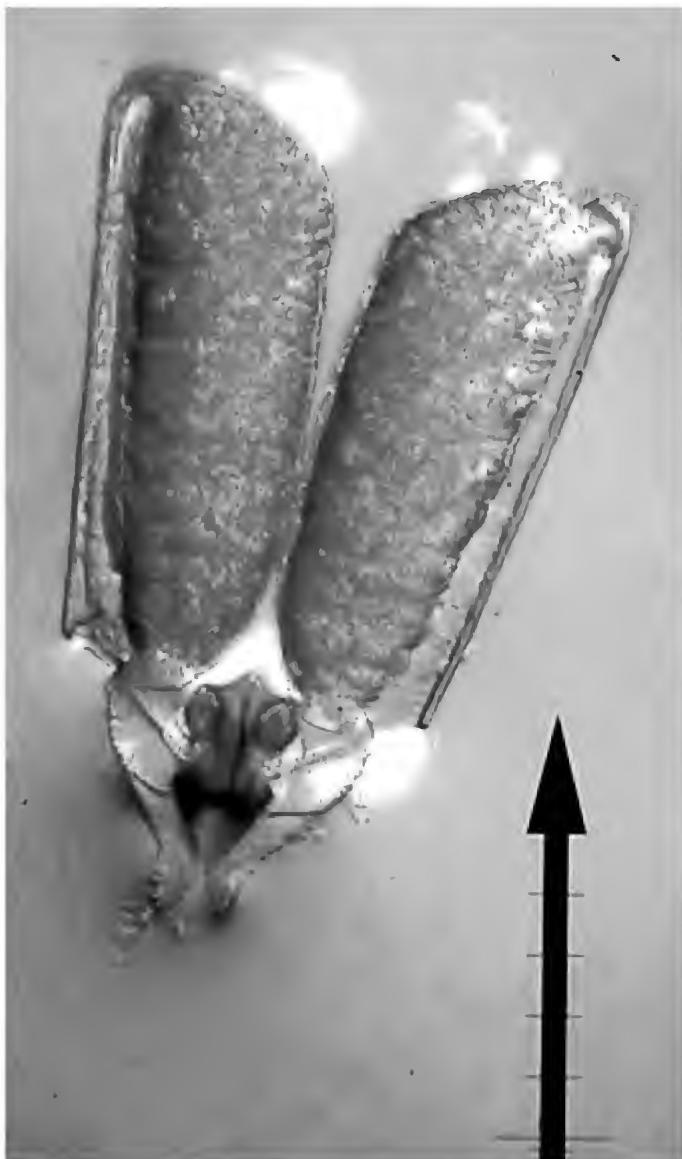
bulb diam.	0.05 mm
Type:	G
Ratios:	pol./width 2.6 pol./ret. 4.3

Translator/caudicle type: d/o

Pollinia apex type: R

Retinacula character: S

***Hoya soligamiana* Kloppenburg & Siar 2009**



A pollinium greatly enlarged. Inner apex broadly rounder, tapering centrally, pellucid edge extends over the inner apex and ends inwardly in a broad end. Everything about this pollinium is beautiful, clear, sharp and well defined.

Pollinium:

length	0.51 mm
widest	0.18 mm

Retinaculum:

length	0.11 mm
shoulders	0.09 mm
waist	0.05 mm
hip	0.09 mm
ext.	0.05 mm

Translators:

length	0.09 mm
deepest	0.04 mm.

Caudicle

bulb diam. 0.07 mm

Type: C

Ratio: poll/ret. 4.6

Pol/width 2.8

Translator/caudicle type: d/o

Pollinia apex type: T

Retinacula character: S

Arrow head in 0.10 mm. long, head width is 0.05 mm wide, same between marks on shaft. Below scale in background is 0.10 mm between longest marks.

***Hoya lambii* Green 2000**
From **Holotype** material #9905 (BISH)



Pollinarium enlarged about 165x.

Pollinia

length	0.51 mm
widest	0.21 mm

Retinaculum

length	0.17 mm
shoulder	0.22 mm
waist	0.05 mm
hip	0.08 mm
extensions	0.10 mm

Translator

length	0.07 mm round
--------	---------------

Caudicle

bulb diam.	0.06 mm
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Translator/caudicle type: d/o

Pollinia inner end type: T

Caudicle bulb: G

Retinacula character: S

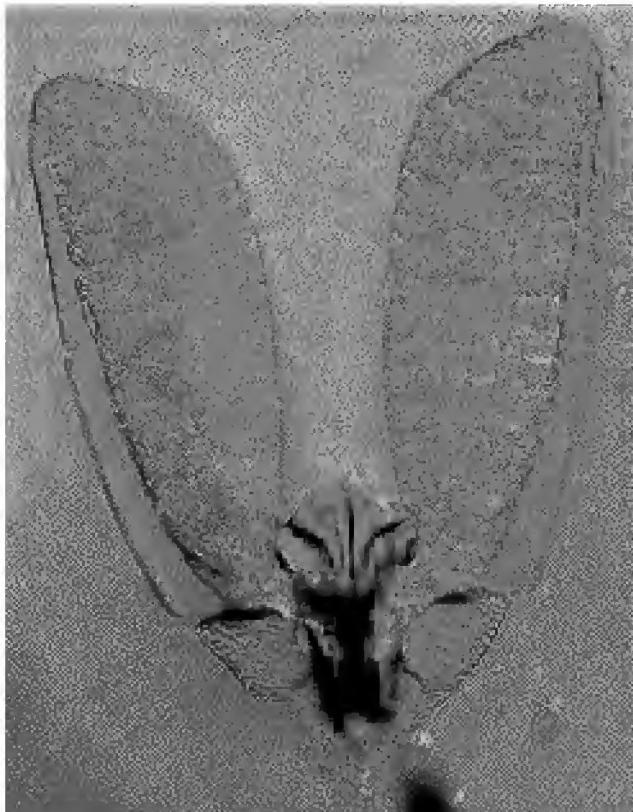
Hoya xxxxxxxx Kloppenburg & M. V. Siar sp. nov.

Flowered in Fresno, CA. clone from Cebu Is., Philippines via
Professor Juan Pancho.

Photomicrograph of Pollinarium enlarged approx. 165x.

This picture shows vividly that seldom are the two pollinia of the same size. This species has a very distinctive retinaculum with well defined features, a large grooved

head also centrally grooved. The translators are large and well defined supporting very small and hardly visible clear caudicles. Both structures (caudicles and translators) seem to be attached well down on the retinaculum. This is a good photo showing all features of a pollinarium.



Pollinium

length:	0.51 mm
widest:	0.18 mm

Retinaculum

length:	0.22 mm
shoulder:	0.11 mm
waist:	0.08 mm
hip:	0.11 mm
ext.:	0.04 mm

Translators

length:	0.12 mm
depth:	0.06 mm

Caudicle

bulb diam.: 0.04 mm

Translator/caudicle type: d/o

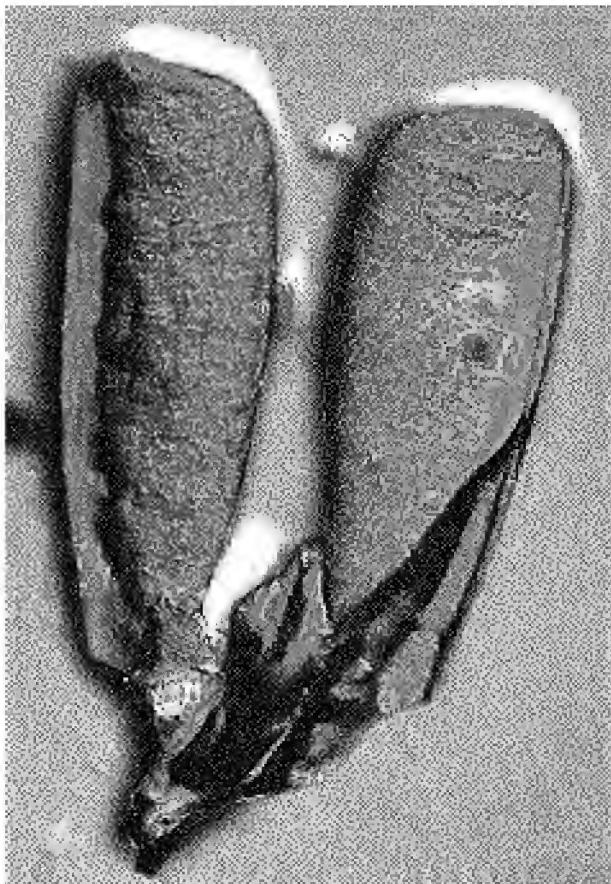
Pollinia inner end type: T

Caudicle bulb: G

Retinacula character: S

Hoya pentaphlebia Merrill 1918

Flower from clone blooming at Fresno, CA. USA.



Pollinarium enlarged approx. 165x. The distinctive feature is the broadly rounded inner lobe of the pollinium, along with a well A A well defined Retinaculum. Translators and caudicles seem to be attached well down on the waist of the retinaculum. The pellucid edge extends well down toward the inner pollinia apex.

Pollinium

length:	0.51 mm
widest:	0.18 mm

Retinaculum

length:	0.23 mm
shoulder:	0.09 mm
waist:	0.06 mm
hip:	0.09 mm
ext.:	0.02 mm

Translators

length:	0.09 mm
depth:	0.03 mm

Caudicle

bulb diam.:	0.05 mm
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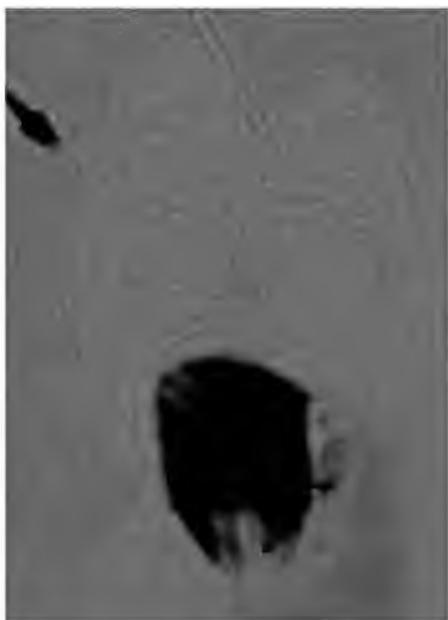
Translator/caudicle type: d/o

Pollinia inner end type: T

Caudicle bulb: G

Retinacula character: S

Hoya cagayanensis Burton 1987
White flowered clone from Monina Siar, Mt. Banahao.



Pollinarium:

Pollinium

length	0.51 mm
widest	0.24 mm

Retinaculum

length	0.25 mm
legs	0.09 mm
head	0.28 mm

Translators

length	0.13 mm
widest	0.05 mm

Caudicle

bulb diam.	0.06 mm
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Translator/caudicle type: d/o

Pollinia inner end type: T

Caudicle bulb: ?

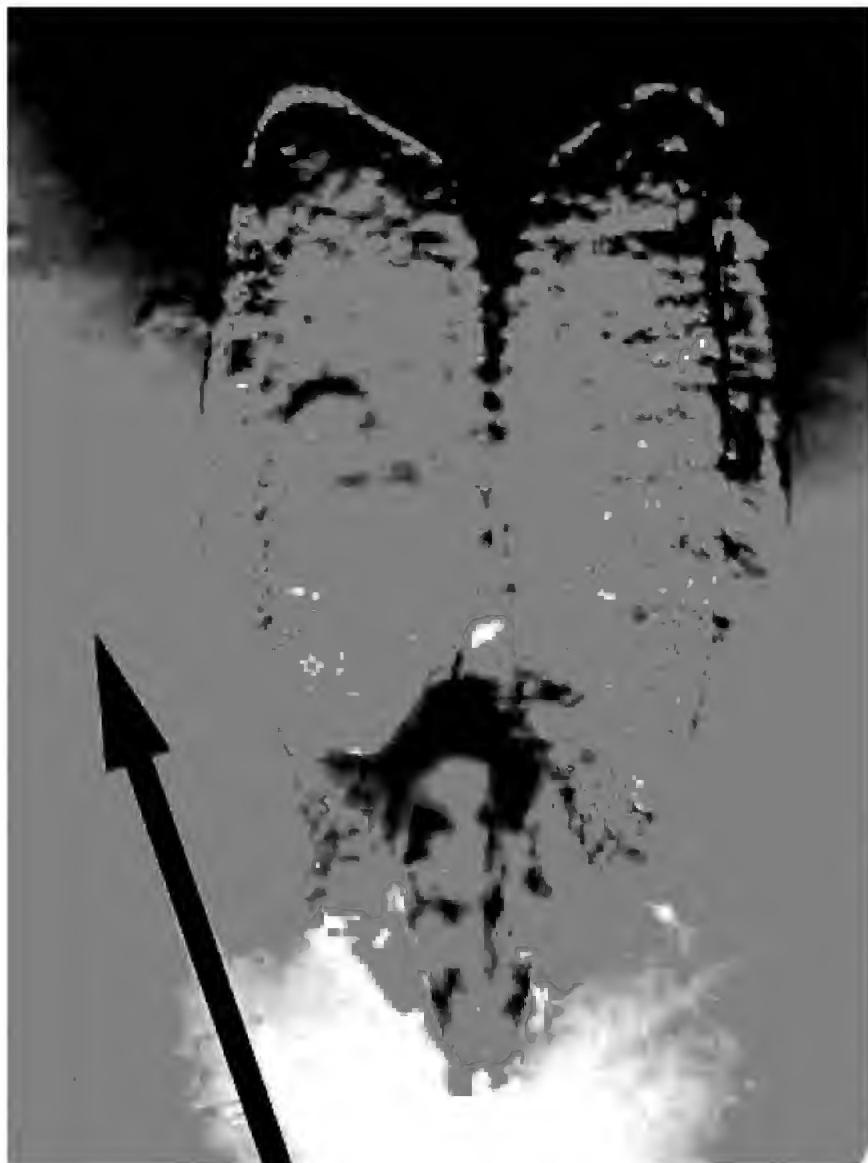
Retinacula character: LN

This pollinarium type is found in Philippine hoyas like bordenii, pimenteliana & cagayanensis.



A more detailed picture of the retinaculum with its head, waste and hips more visible. The extensions (legs) are not well defined as is the body but nevertheless relatively long.

***Hoya butleriana* Kloppenburg, Siar, Guevarra & Carandang 2013**
***Hoya* sp. Purificacion #3 Type clone**



Pollinarium
enlarged about
165x.

Pollinium		Translator	
length	0.51 mm	length	0.11 mm
widest	0.22 mm	widest	0.05 mm
Retinaculum		Caudicle	
length	0.29 mm	bulb diam.	0.04 mm
shoulder	0.14 mm		
waist	0.06 mm		
hip	0.08 mm		
ext	0.02 mm		
Translator/caudicle type:	d/o	Retinacula character:	LS
Pollinia inner end type:	T	Caudicle bulb:	C ?

***Hoya aurigueana* subsp. *alticolora* Kloppenburg & Mendoza**
(unpublished) GM #30



Pollinaria
enlarged ca. 140x.

Pollinium
length 0.50 mm
widest 0.20 mm

Retinaculum
length 0.06 mm
shoulder 0.12 mm
hip 0.04 mm
waist 0.08 mm
ext. 0.08 mm

Translators
length 0.13 mm
depth 0.04 mm
unusual shape

Caudicle
bulb diam. 0.06
mm

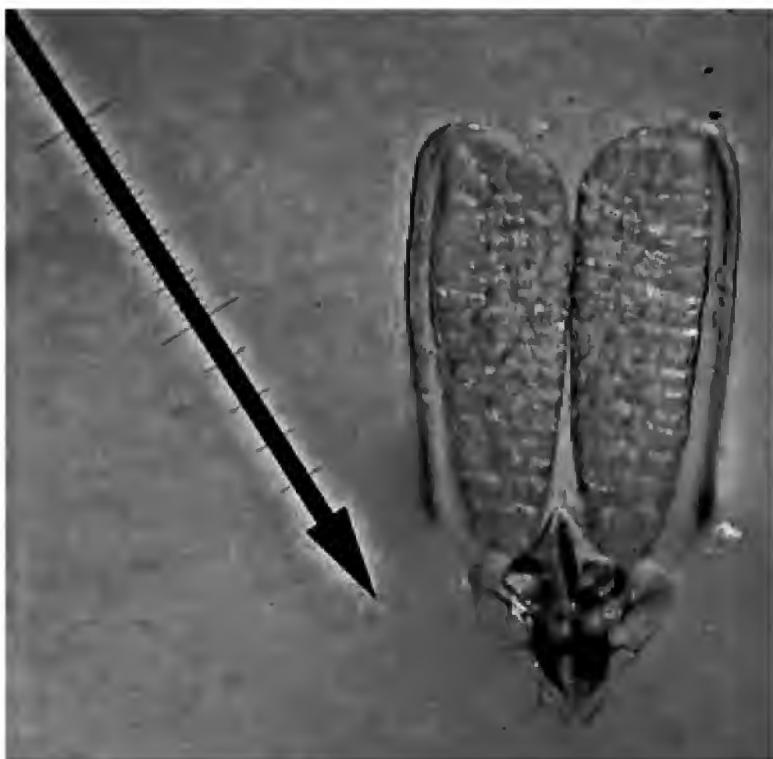
Translator/caudicle type: d/o or p/o difficult to classify.

Pollinia end type: R

Caudicle bulb: G ?

Retinacula character: S

***Hoya elsaae* Kloppenburg & Mendoza**



Pollinium enlarged ca.
125x.

Pollinium

length	0.50 mm
widest	0.17 mm

Retinaculum

length	0.15 mm
shoulder	0.15 mm
waist	0.05 mm
hip	0.08 mm
ext,	0.04 mm

Translator

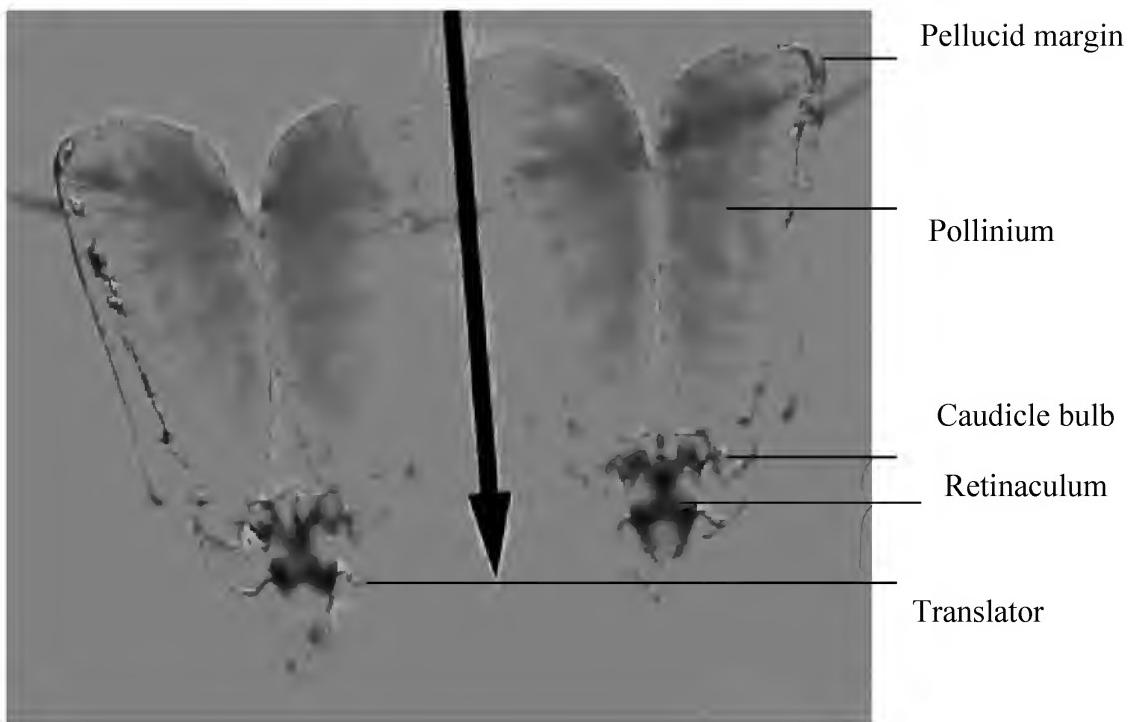
length	0.10 mm
widest	0.04 mm

Caudicle

bulb diam.	0.04 mm
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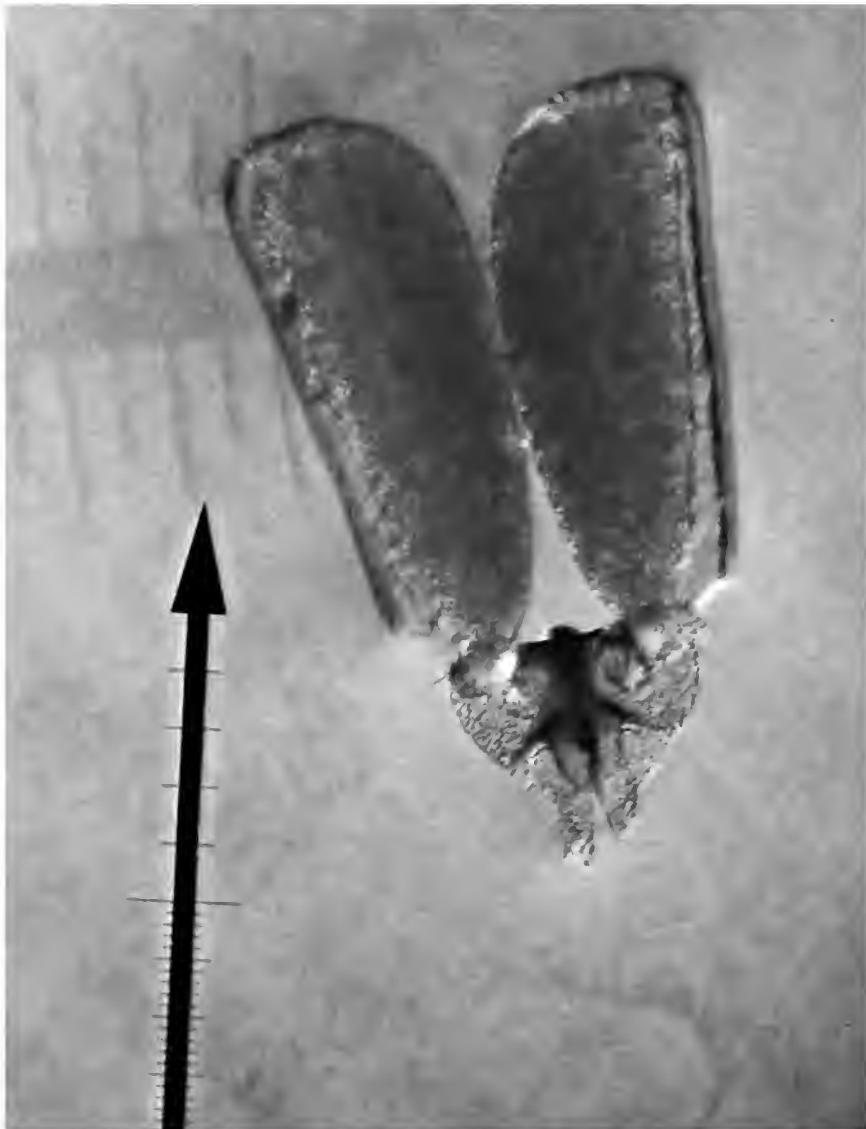
Translator/caudicle type: d/o **Retinacula type:** S (shield) **Pollinia inner end type:** R (round).

***Hoya marsianii* Kloppenborg & Mendoza**
(unpublished) GM #29



Two Pollinarium greatly enlarged, measurements on photo below.

The arrow head is 0.01 mm long and its base 0.005 mm wide. The pellucid edge extends a little way over the pollinia inner edge and nearly even with its attachment end. Caudicle ends to which the pollinia are stuck are round "o" shaped.



Pollinarium
enlarged ca. 100x:

Pollinium:
length 0.50 mm
widest 0.19 mm

Retinaculum:
length 0.11 mm
shoulder 0.14 mm
waist 0.08 mm
hip 0.10 mm
ext. 0.05 mm

Translator:
length 0.10 mm
widest 0.05 mm

Caudicle:
bulb diam. 0.06 mm

Note: the translator
and caudicle inner
ends are attached to
the outer wall of the
retinaculum at the
shoulder.

Translator/caudicle type: d/o

Pollinia end type: R

Caudicle bulb: G ?

Retinacula character: S

***Hoya marionii* Kloppenburg & Mendoza**



Pollinarium
enlarged 170x.

Pollinium
length 0.50 mm
widest 0.11 mm

Retinaculum
length 0.15 mm
shoulder 0.06 mm
waist 0.04 mm
hip 0.05 mm
ext. 0.3 mm

Translator
length 0.06 mm
depth 0.02 mm

Caudicle
bulb 0.03 mm
G

Retinacula: E

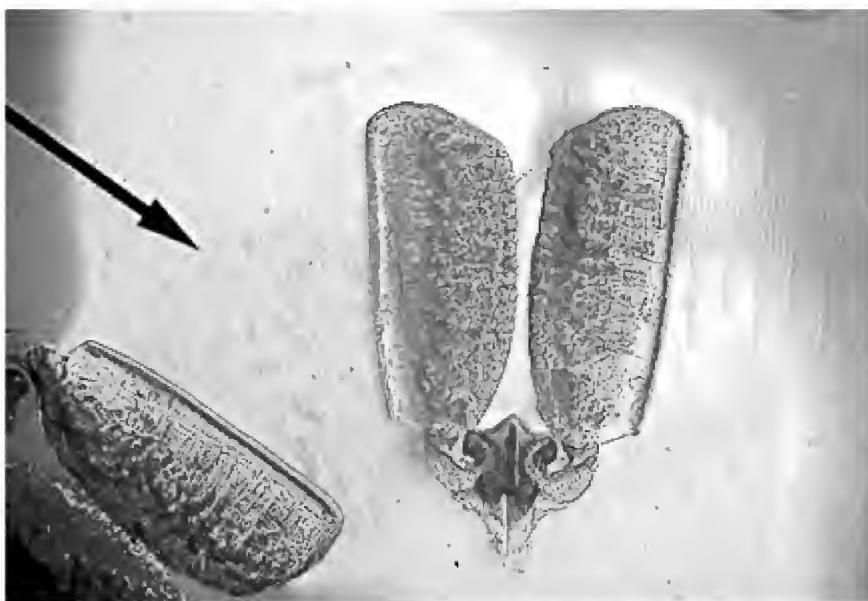
**Translator/
Caudicle type: d/o**

Pollinia end type: R

Retinacula: E

Ratios: p/w 4.5 p/r 3.3

Hoya perangensis Kloppenburg & Siar
Unpublished



Pollinarium
enlarged about
165x.

Pollinium

length	0.49 mm.
widest	0.20 mm.

Retinaculum

length	0.11 mm.
shoulder	0.14 mm.
waist	0.05 mm.
hip	0.10 mm.
ext.	0.05 mm.

Type: S

Translators

length	0.11 mm.
wide	0.01 mm.
depth	0.05 mm.

Caudicle

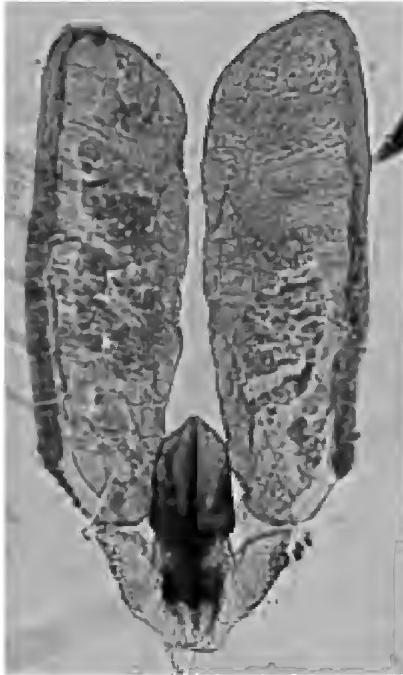
bulb diam. 0.05 mm.

Type: C

Translator/caudicle type: d/o

Pollinia inner end type: RT

**Photomicrographs from clone 910301 collected by Blass
Hernaez to me via Dexter Heuschkel**



Pollinarium enlarged about 82x.

Pollinia

length	0.48 mm
widest	0.16 mm

Retinaculum

length	0.18 mm excluding extensions
shoulders	0.08 mm
waist	0.04 mm
hips	0.05 mm
extensions	0.04 mm

Translators

length	0.09 mm very wide and extending well below attachment point.
widest	0.01 mm ca
depth	0.04 mm ca.

Caudicle bulb 0.05 mm in diameter.

Clear

Translator/caudicle: d/o

Pollinia inner ends: T

Retinacula: LS

Hoya cf. fitchii vial #20



Pollinarium
enlarged ca. 170x.

Pollinium
length 0.48 mm
widest 0.19 mm

Retinaculum
length 0.14 mm
shoulder 0.14 mm
waist 0.08 mm
hip 0.10 mm
ext. 0.06 mm

Translator
length 0.14 mm
depth 0.03 mm

Caudicle
bulb 0.07 mm

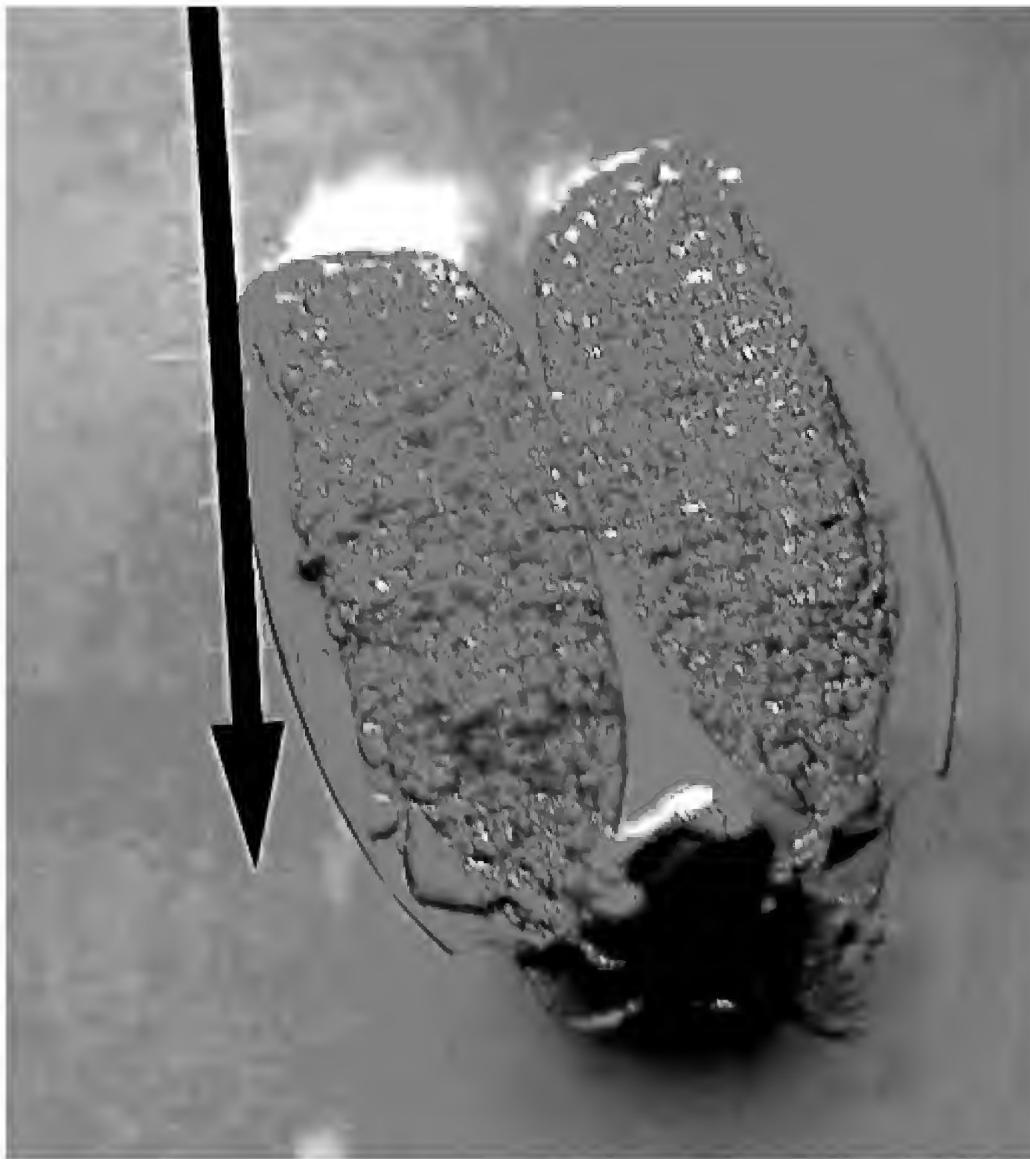
Type: G

Translator/Caudicle Type: d/o

Pollinia inner end type: R

Retinacula character: S

Hoya blashernaiaeii ssp. valmayoriana Kloppenburg, Guevarra, &
Carandang
ISSN 1655-3179 Type clone.



Pollinium enlarged ca. 200x.

Pollinium		Translator	
length	0.48 mm	length	0.10 mm
widest	0.23 mm	depth	0.05 mm
Retinaculum		Caudicle	
length	0.10 mm	bulb diam.	0.04 mm
shoulder	0.15 mm	Retinacula character:	S
waist	0.07 mm	Translator type:	d/o
hip	0.08 mm	Pollinia inner end type:	R
ext.	0.04 mm	Caudicle bulb:	C

***Hoya crassicaulis* Elmer ex Kloppenburg 1995**

Flower from **Type** specimen Elmer #14440
Mt Bulusan, Sorsogon, Luzon, Philippines.



	<u>top subject</u>	<u>bottom subject</u>
Pollinium		
length:	0.48 mm	0.43 mm
widest:	0.18 mm	0.16 mm
Retinaculum		
length:	0.21 m	0.18 mm
shoulder:	0.09 mm	0.10 mm
waist:	0.06 mm	0.06 mm
hip:	0.08 mm	0.10 mm
ext.:	?	?
Translators		
length:	?	?
depth:	?	?
Caudicle		
bulb diam.:	?	?

Magnified approximately 165x.

Magnified approximately 165x.

Note: This grouping points out one of the difficulties with working with herbarium material. This material was soaked in 'Kew Solution' to make it more pliable to manipulation. In spite of this the retinaculum tended to remain curved and thus difficult to get precise measurements. Overall the relationships of relative size and shape of parts can be recognized.



Translator/caudicle type: d/o

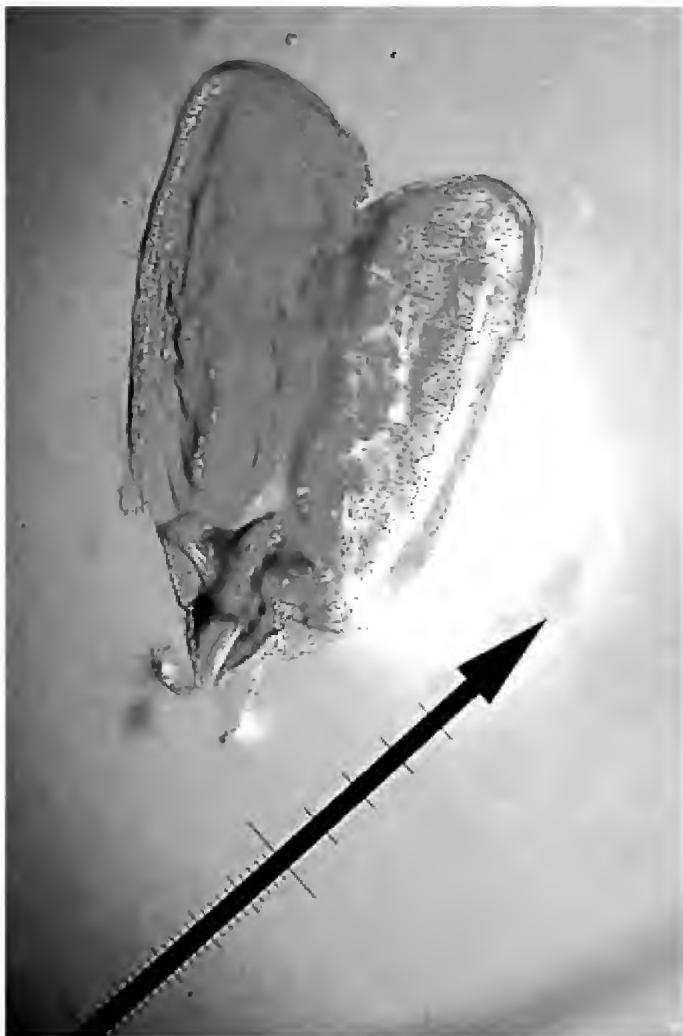
Pollinia inner end type: R

Caudicle bulb: ?

Retinacula character: S

**Hoya palawanensis subsp. minora Kloppenburg
CAHUP #5297**

Determined to be very close to 900307 (H. merrillii)



7

Pollinaria enlarged about 165x.

Pollinium

length	0.47 mm.
widest	0.20 mm.

Retinaculum

length	0.12 mm.
shoulder	0.11 mm.
waist	0.06 mm.
hip	0.08 mm.
ext.	0.06 mm.

Translators

length	0.12 mm
depth	0.01 mm.

Caudicle

bulb diam.	0.08 mm.
------------	----------

Ret. Pol ratio 1:4.3

Translator/caudicle type: d/o

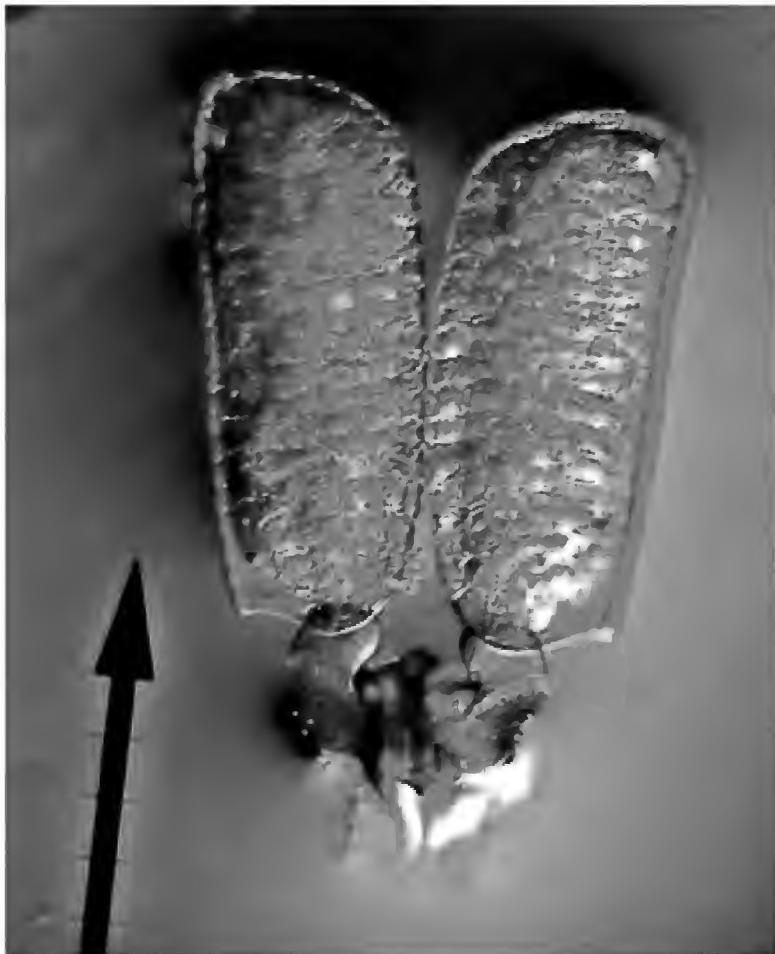
Pollinia inner end type: RT

Caudicle bulb: C

Retinacula character: S

Sheet labeled Hoya macgregorii Schlechter but it is not that species. Outer lobes of corona on that species are not "breviter excises" briefly excised. Most closely resembles sp. 900307 that I believe is *Hoya merrillii* Schlechter.

***Hoya palawanensis* subsp. *majora* Kloppenburg, Siar, Mendoza,
Guevarra & Carandang 2012**



Pollinaria enlarged about
150x.

Pollinium

length	0.47 mm
widest	0.19 mm

Retinaculum

length	0.10 mm
shoulder	0.12 mm
waist	0.05 mm
hip	0.08 mm
ext.	0.04 mm

Translator

length	0.12 mm
depth	0.06 mm

Caudicle

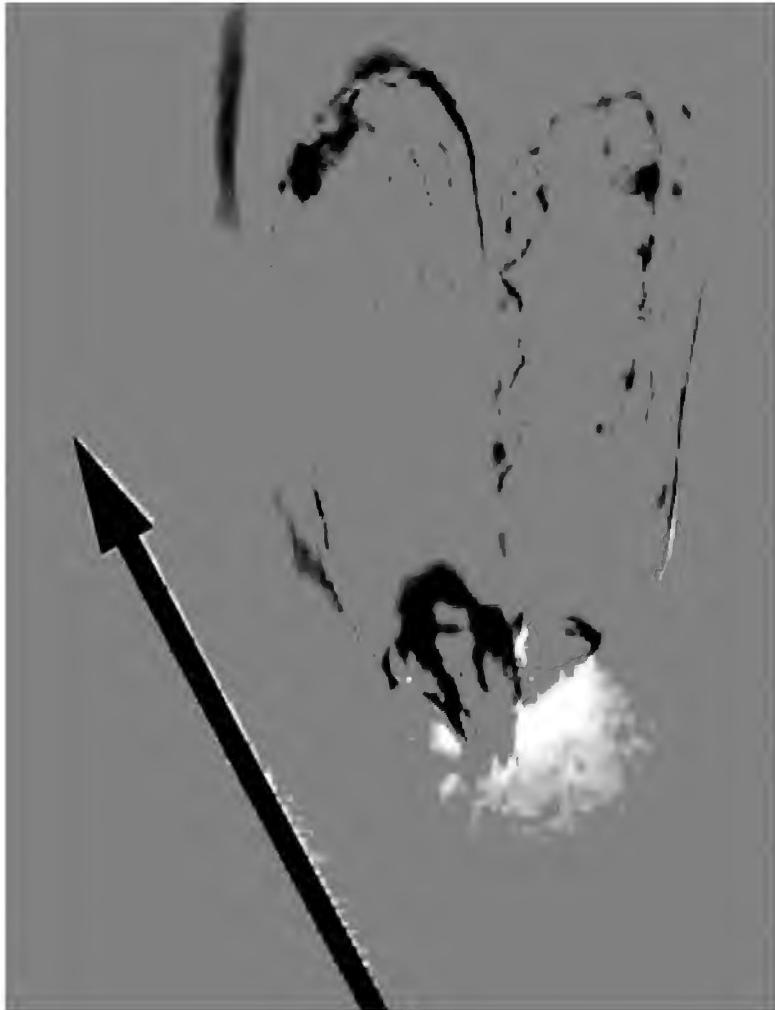
bulb diam. 0.07 mm

Type: Clear

Translator Type: d/o

Pollinia inner end type: R

Hoya makatongensis Kloppenburg & Mendoza
(unpublished) GM #152



Pollinaria enlarged 140x.

Pollinium

length	0.47 mm
widest	0.18 mm

Retinaculum

length	0.14 mm
shoulder	0.15 mm
waist	0.10 mm
hip	0.10 mm
ext.	0.03 mm

Translator

length	0.10 mm
wide	0.03 mm

Caudicle

bulb diam.	0.06 mm
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Translator/caudicle type:
ls/o might be d/o

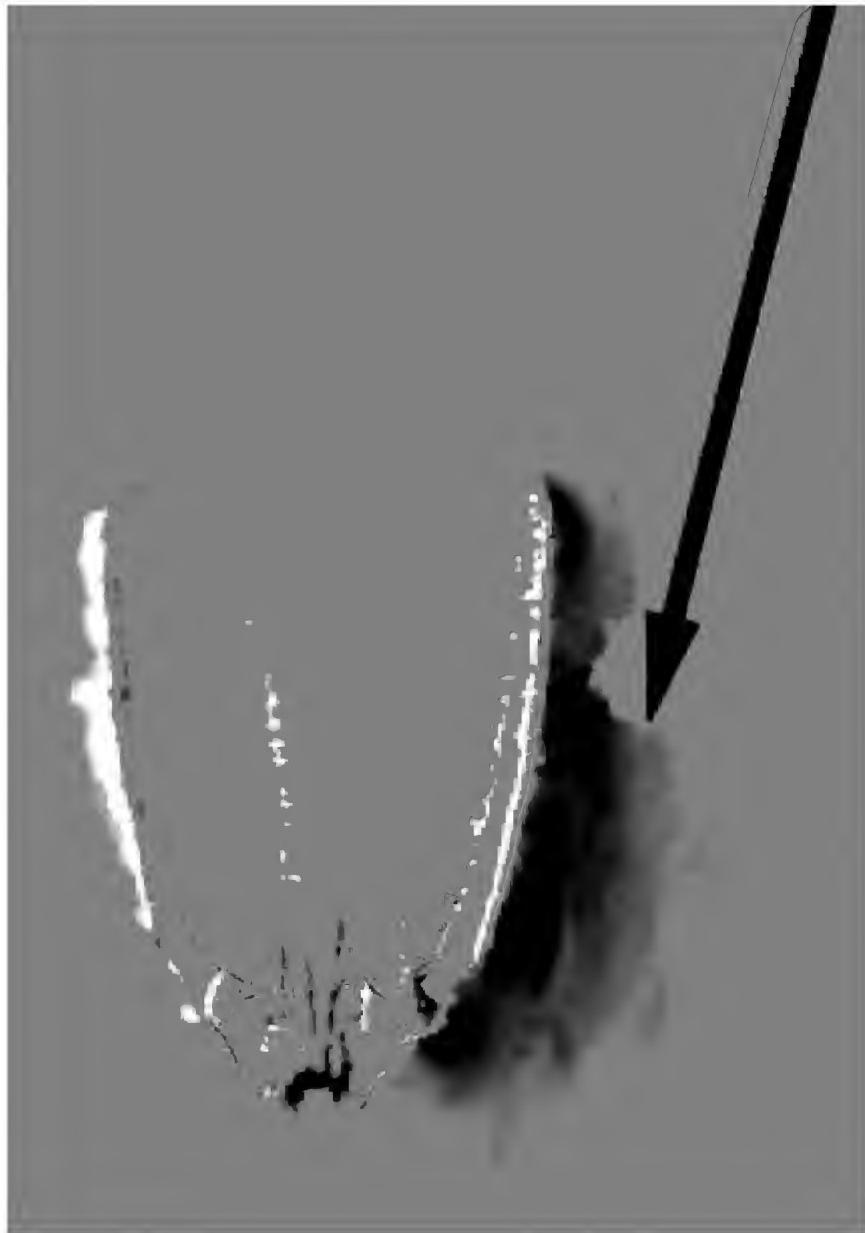
Pollinia apex type: RT

Caudicle bulb: C

Retinacula character: S

Hoya marlowei subsp. *infantaensis* Kloppenburg & Mendoza
(unpublished) GM #8

Pollinarium enlarged ca. 140x.



Pollinium

length 0.47 mm
widest 0.16 mm

Retinaculum

length 0.20 mm
shoulder 0.08 mm
waist 0.04 mm
hip 0.07 mm
ext. 0.06 mm

Translator

length 0.16 mm
depth 0.05 mm

Caudicle

bulb 0.08 mm

Translator/caudicle type: d/o

Ratios: p/w 2.9 p/r 2.4

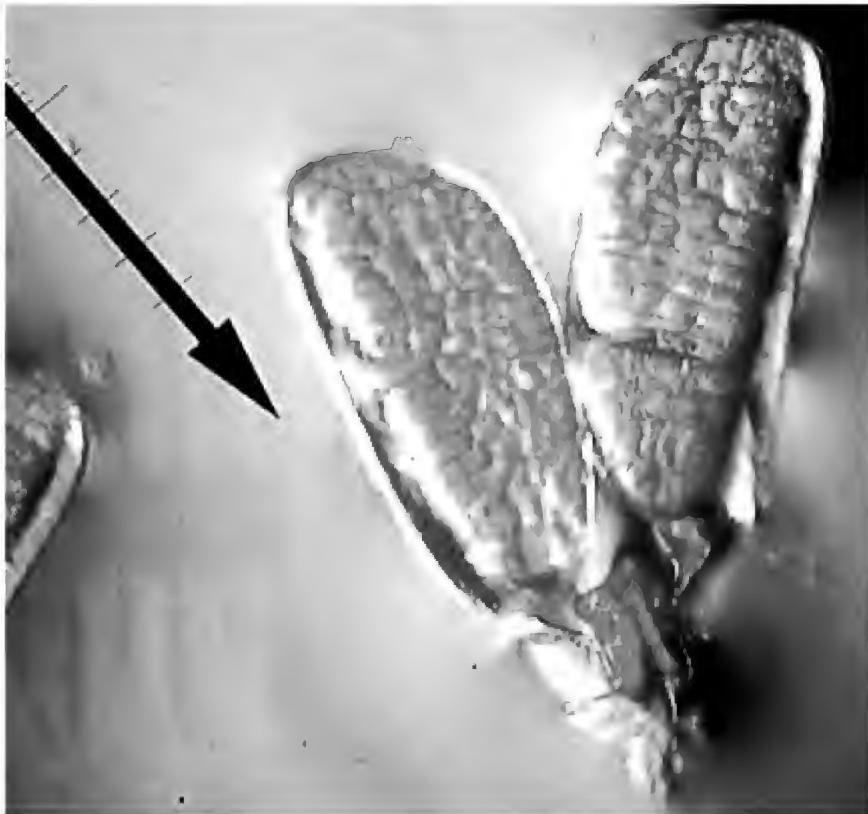
Pollinia end type: RT

Retinacula character: LS

Caudicle bulb: C

***Hoya benvergarae* Kloppenburg & Siar 2008**

Pollinaria enlarged about 165x.



Pollinium: with rounded inner apices, pellucid edge extends to base but not around end.

length 0.47 mm
widest 0.21 mm

Retinaculum:

length 0.13 mm
shoulder 0.10 mm
waist 0.06 mm
hip 0.07 mm
ext. 0.04 mm

Translators:

length 0.10 mm
depth 0.05 mm

Caudicle:

bulb diameter 0.05 mm

Type: C

Ratio: r/p 2.6; p/w 2.1

Translator/caudicle type: d/o

Pollinia apex type: T

Retinacula character: S

***Hoya benvergarai* subsp. *gelba* Kloppenburg & Mendoza**
(unpublished) GM #78



Pollinaria enlarged ca.
151x

Pollinium

length	0.47 mm
widest	0.20 mm

Retinaculum

length	0.19 mm
shoulder	0.12 mm
waist	0.08 mm
hip	0.09 mm
ext	0.03 mm

Translator

length	0.10 mm
wide	0.03 mm

Caudicle

bulb diam. 0.05 mm

Type: C

Translator/caudicle type:
d/o

Pollinia inner end type: T

Caudicle bulb: C

Retinacula character: S

***Hoya linapauliana* Kloppenburg, Siar & Mendoza,**
(unpublished) # Q5-188



Pollinarium enlarged ca.
160x.

Pollinium

length	0.47 mm
widest	0.20 mm

Retinaculum

length	0.15 mm
shoulder	0.14 mm
waist	0.07 mm
hip	0.10 mm
ext.	0.05 mm

Translator type:

length	0.10 mm
depth	0.04 mm

Caudicle

bulb diam.	0.02 mm
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Ratios: p/r 3.1

p/w 2.4

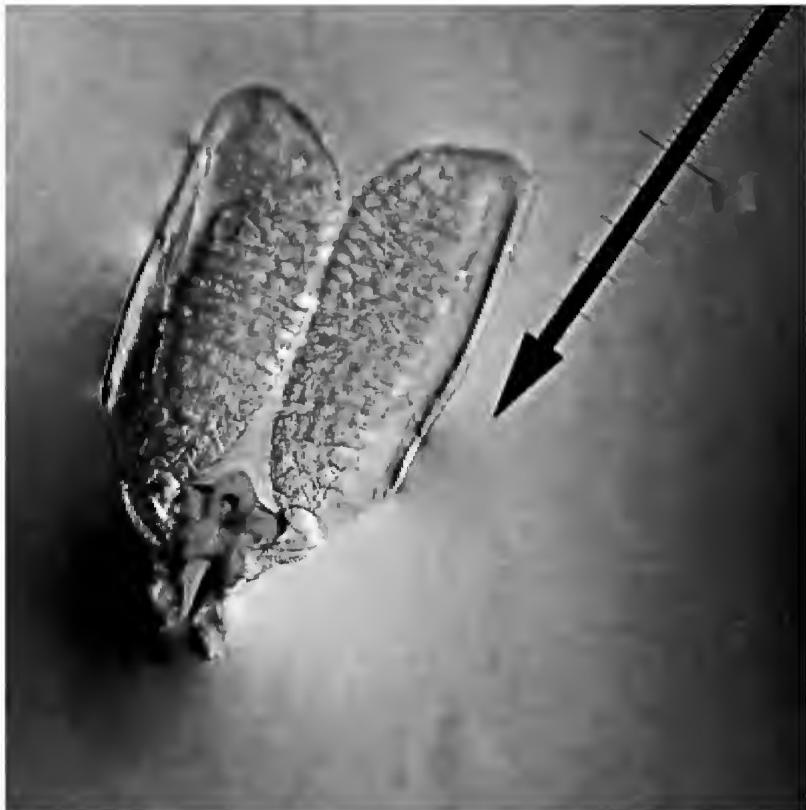
Translator/caudicle type:
d/o

Pollinia inner end type: R

Caudicle bulb: G

Retinacula character: S

***Hoya linapauliana* subsp. *verida* Kloppenburg, Siar, Cajano
(unpublished) #Q5-162**



Pollinarium enlarged
160x.

Pollinium

length	0.47 mm
widest	0.20 mm

Retinaculum

length	0.13 mm
shoulder	0.14 mm
waist	0.05 mm
hip	0.08 mm
ext.	0.07 mm

Translator

length	0.10 mm
depth	0.03 mm

Caudicle

bulb diam.	0.04 mm
------------	---------

Type: C

Ratios: p/r 4.7 p/w 2.4

Translator/caudicle type: d/o

Pollinia inner end type: T

Retinacula character: S

***Hoya linapauliana* subsp. *nakarensis* Kloppenburg & Mendoza**
(unpublished) GM #87



Pollinaria enlarged ca.

Pollinium

length	0.47 mm
widest	0.20 mm

Retinaculum

length	0.15 mm
shoulder	0.15 mm
waist	0.08 mm
hip	0.10 mm
ext.	0.05 mm

Translator

length	0.10 mm
wide	0.05 mm

Caudicle

bulb diam. 0.05 mm

Translator/caudicle

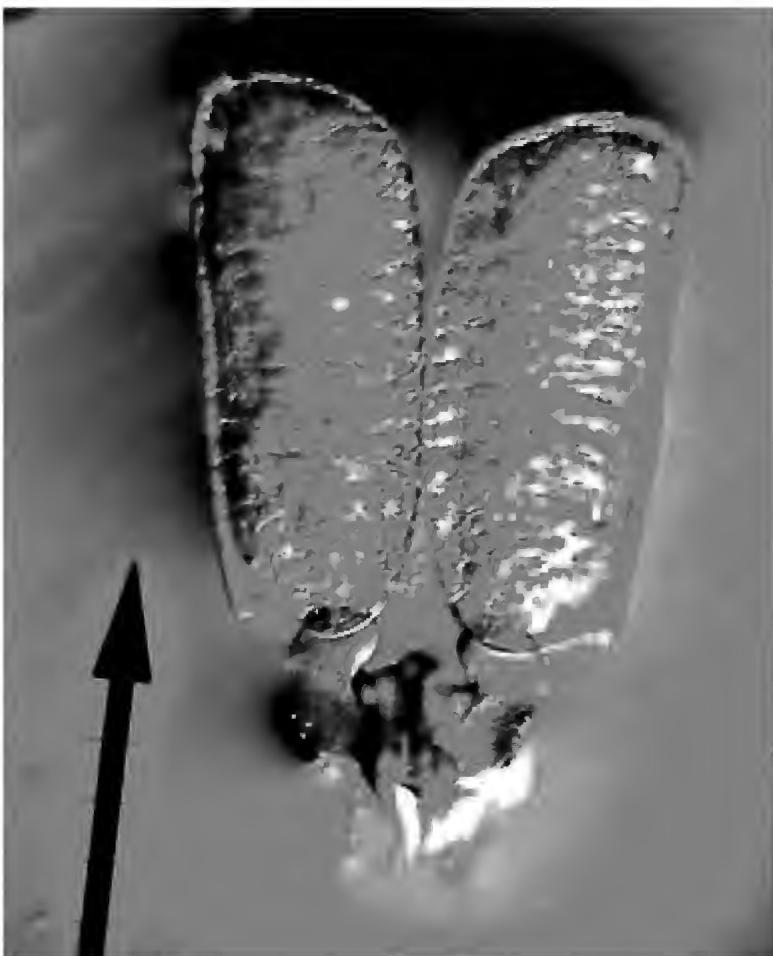
Type: d/o

Pollinia inner end type: R

Caudicle bulb: C

Retinacula character: S

***Hoya palawanensis* Kloppenburg, Siar & Mendoza 2015**



Pollinaria enlarged about 150x.

Pollinium

length	0.47 mm
widest	0.19 mm

Retinaculum

length	0.10 mm
shoulder	0.12 mm
waist	0.05 mm
hip	0.08 mm
ext.	0.04 mm

Translator

length	0.12 mm
depth	0.06 mm

Caudicle

bulb diam.	0.07 mm
------------	---------

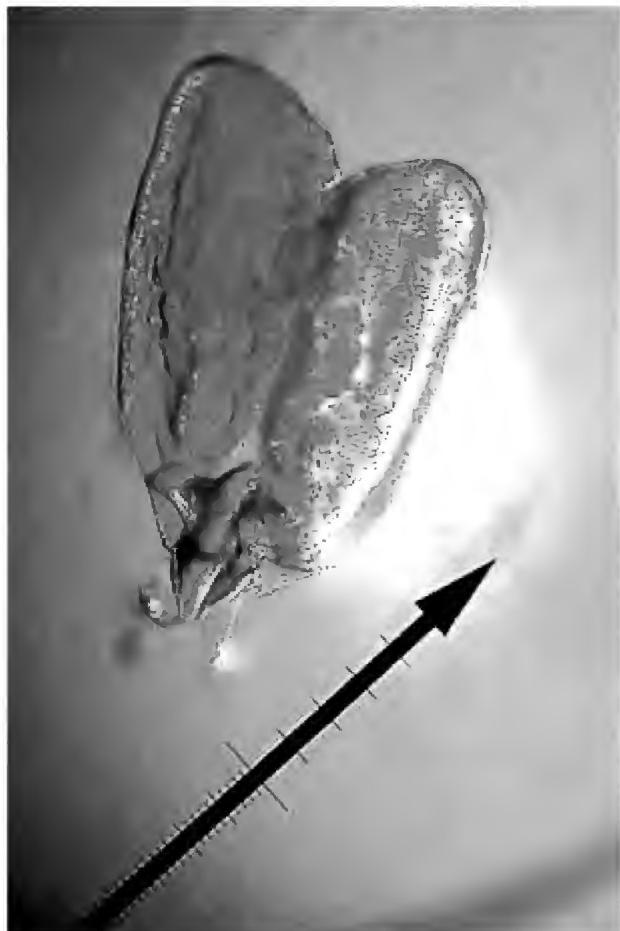
Translator Type: d/o

Pollinia inner end type: R

Caudicle bulb: C

Retinacula character: HU

***Hoya palawanensis* subsp. *minora* Kloppenburg 2015**



Pollinarium enlarged about 155x.

Pollinium

length	0.47 mm
widest	0.20 mm

Retinaculum

length	0.12 mm
shoulder	0.11 mm
waist	0.06 mm
hip	0.08 mm
ext.	0.06 mm

Translators

length	0.12 mm
depth	0.01 mm

Caudicle

bulb diam.	0.08 mm
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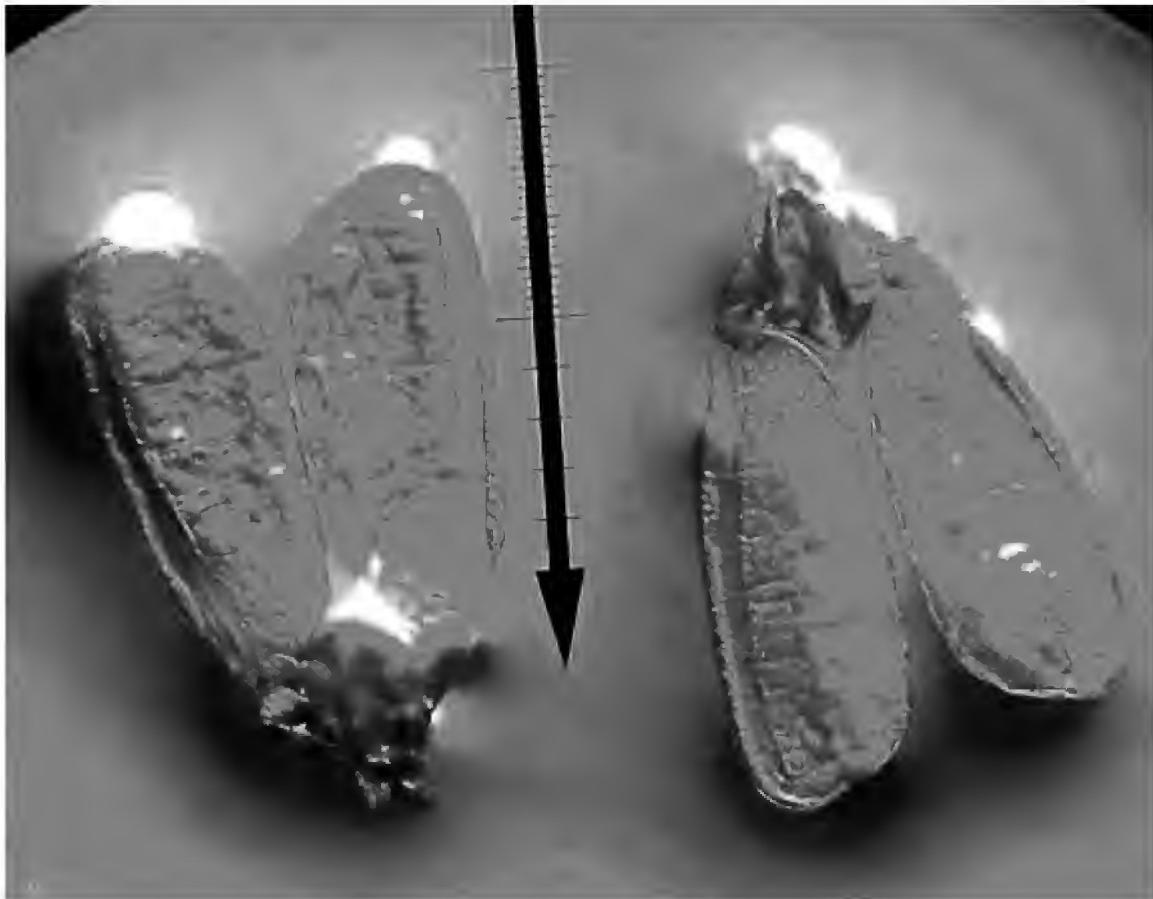
Ret/Pol ratio 1:4.3

Translator/caudicle type: d/o

Pollinia inner end type: RT

Retinacula type: S

Hoya sp. 2012-4-029
13 May 2012 2012-4-29 H. fitchii?



Pollinaria above:

Pollinium

length	0.47 mm
widest	0.18 mm

Retinaculum

length	0.17 mm
shoulder	0.12 mm
waist	0.10 mm
hip	0.09 mm
ext.	0.05 mm

Translator

length	0.10 mm
width	0.03 mm

Caudicle

bulb diam. 0.06 mm clear

Caudicle bulb: C

Translator type: d/o

Pollinia inner end type: R

Retinacula character: S

Photomicrographs from #900355 via Dexter Heuschkel Philippines. Fresno, California bloom 8/4/91 3 clusters 1st blooming 34 flowers with center forming new buds, flowers creamy yellow with bronze reflexed lobes, corona white and horizontal dorsal, outer apex turns up slightly.



Pollinaria enlarged about 165x.

Pollinia
length 0.47 cm
widest 0.16 cm

Retinaculum
length 0.19 cm
shoulder 0.09 cm
waist 0.05 cm
hip 0.07 cm
ext. 0.06 cm

Translators
length 0.09 cm
deepest 0.05 cm

Caudicle bulb diam. 0.05 cm

Translator/caudicle type: d/o

Pollinia end type: T

Caudicle bulb: G ?

Retinacula character: AS

Hoya cajanoae Kloppenburg
(unpublished) pink



Pollinarium
enlarged 135x.

Pollinium

length	0.46 mm
widest	0.20 mm

Retinaculum

length	0.21 mm
shoulder	0.11 mm
waist	0.07 mm
hip	0.08 mm
ext.	0.05 mm

Translator

length	0.07 mm
wide	0.06 mm

Caudicle

bulb	0.06 mm
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Translator/caudicle type:

d/o

The retinaculum head is rounded, shoulder area of the retinaculum is 0.08 cm long, Translator inner ends appear to be attached to the outer surface of the retinacular inner channel. Pollen grains are well defined and large. Pellucid edge ends well above the pollinia lower apex.

Pollinia inner end type: T

Caudicle bulb: G

Retinacula character: LS



Pollinaria
enlarged, photo by
Jorge R. Sahagun,
Fernando Arugue's
assistant.

Pollinia
length 0.46 mm
widest 0.20 mm

Retinaculum
length 0.11 mm
shoulder 0.10 mm
hip 0.08 mm
waist 0.09 mm
ext. 0.03 mm

Translators
length 0.18 mm

Caudicle bulb
diam. 0.06 mm
Type: G

Translator Type: d/o

Pollinia inner end type: T

Caudicle bulb: G

Retinacula character: S

***Hoya lagunaensis* Kloppenburg 2015
sp. CAHUP 5965**



Pollinaria enlarged about 165x.

Pollinium

length 0.46 mm
widest 0.18 mm

Retinaculum

length 0.14 mm
shoulder 0.10 mm
waist 0.05 mm
hip 0.08 mm
ext 0.06 mm

Translator

length 0.08 mm
depth 0.03 mm

Caudicle

bulb diam. 0.05mm



Ratio Ret.- Poll.: 1:3.3

Translator Type: d/o

Pollinia inner end type: RT

Caudicle bulb: G

Retinacula character: S

***Hoya cagayanensis* Burton 1987**

from #45730 (UC)

Casiguran, Tayabas Prov., Luzon, Philippines,

20 June 1925.



Pollinarium enlarged ca. 165x.
Just as Dr. Schlechter drew it on his
herbarium sheet.

Pollinarium

length	0.46 mm
widest	0.26 mm

Retinaculum

length	0.39 mm
shoulder	0.27 mm
waist	0.11 mm
hip	0.12 mm
ext.	0.07 mm

Translators

length	0.12 mm
depth	0.03 mm

Caudicle

bulb diam.	?
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Translator Type: d/o

Pollinia inner end type: T

Caudicle bulb: ?

Retinacula character: LN

Hoya incrassata Warburg 1904
Flower from clone #90143 flowered in Fresno, CA.



Pollinarium picture with the monocular scope enlarged about 165x. Inner lobes of pollinia truncate inward, outer pellucid edge curved in near outer apex. Translators tight to sides, rather wide, caudicle bulb difficult to detect. Retinacula large proportionately little definition, short extensions.

Pollinium

length	0.46 mm
widest	0.16 mm

Retinaculum

length	0.20 mm
shoulder	0.08 mm
waist	0.08 mm
hip	0.09 mm
extensions	0.03 mm

Translators

length	0.12 mm
depth	0.04 mm

Caudicle

bulb diam. 0.05 mm

Translator Type: d/o

Pollinia inner end type: F

Caudicle bulb: G

Retinacula character: E

Notation: It has been inferred that this species is synonymous with *Hoya crassicaulis* (Elmer) ex Kloppenburg. Compare the floral details in this folder with that of the other. There are many differences among others the rarity of this species in comparison to the other.

Hoya forbesii King & Gamble 1903



Pollinarium
enlarged about 165x. It has
an unusually long narrow
retinaculum.

Pollinium

length	0.46 mm
widest	0.19 mm

Retinaculum

length	0.22 mm
shoulder	0.07 mm
waist	0.02 mm
hip	0.05 mm
ext.	0.03 mm

Translators

length	0.10 mm
depth	0.03 mm

Caudicle

bulb diam. 0.06 mm

Translator Type: d/o

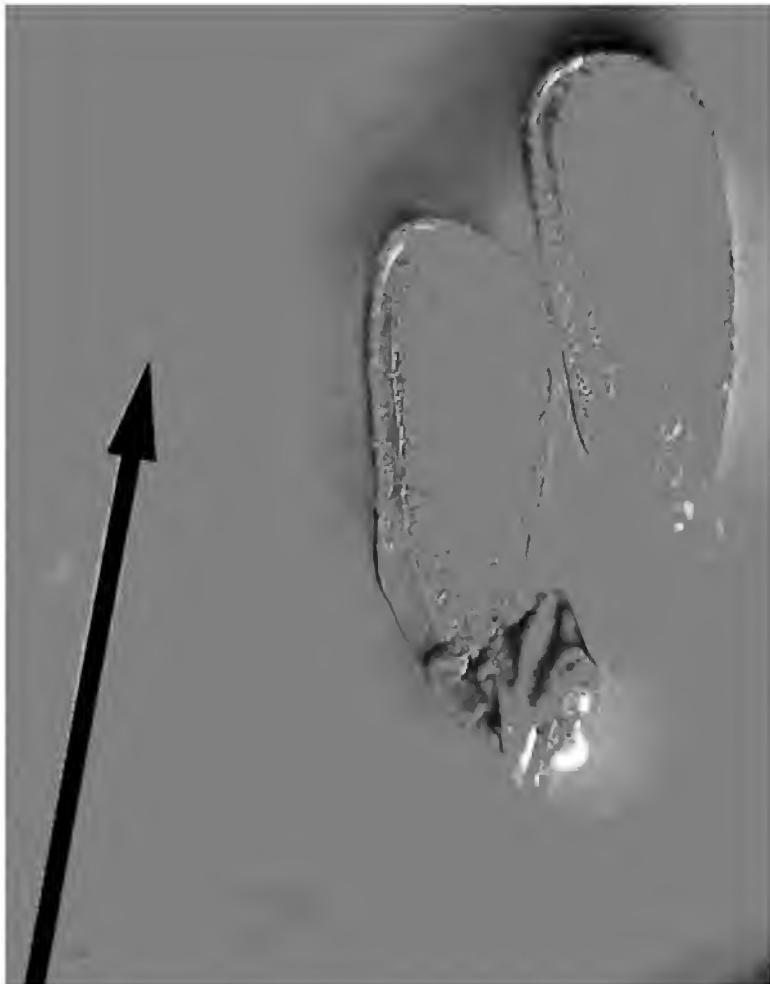
Pollinia inner end type: R

Caudicle bulb: C

Retinacula character: E

Translators are very upright, otherwise deltoid, caudicles not in clear focus appear as a shadow at lower apex of pollinium. Pollinia are widest toward inner apex, apex away from the caudicle.

***Hoya auripigmenta* Kloppenburg & Mendoza**
(unpublished) GM #139



Pollinaria enlarged ca.
120x.

Pollinium

length	0.45 mm
widest	0.21 mm

Retinaculum

length	0.15 mm
shoulder	0.15 mm
waist	0.07 mm
hip	0.10 mm
ext.	0.04 mm

Translator

length	0.15 mm
wide	0.04 mm

Caudicle

bulb diam.	0.05 mm
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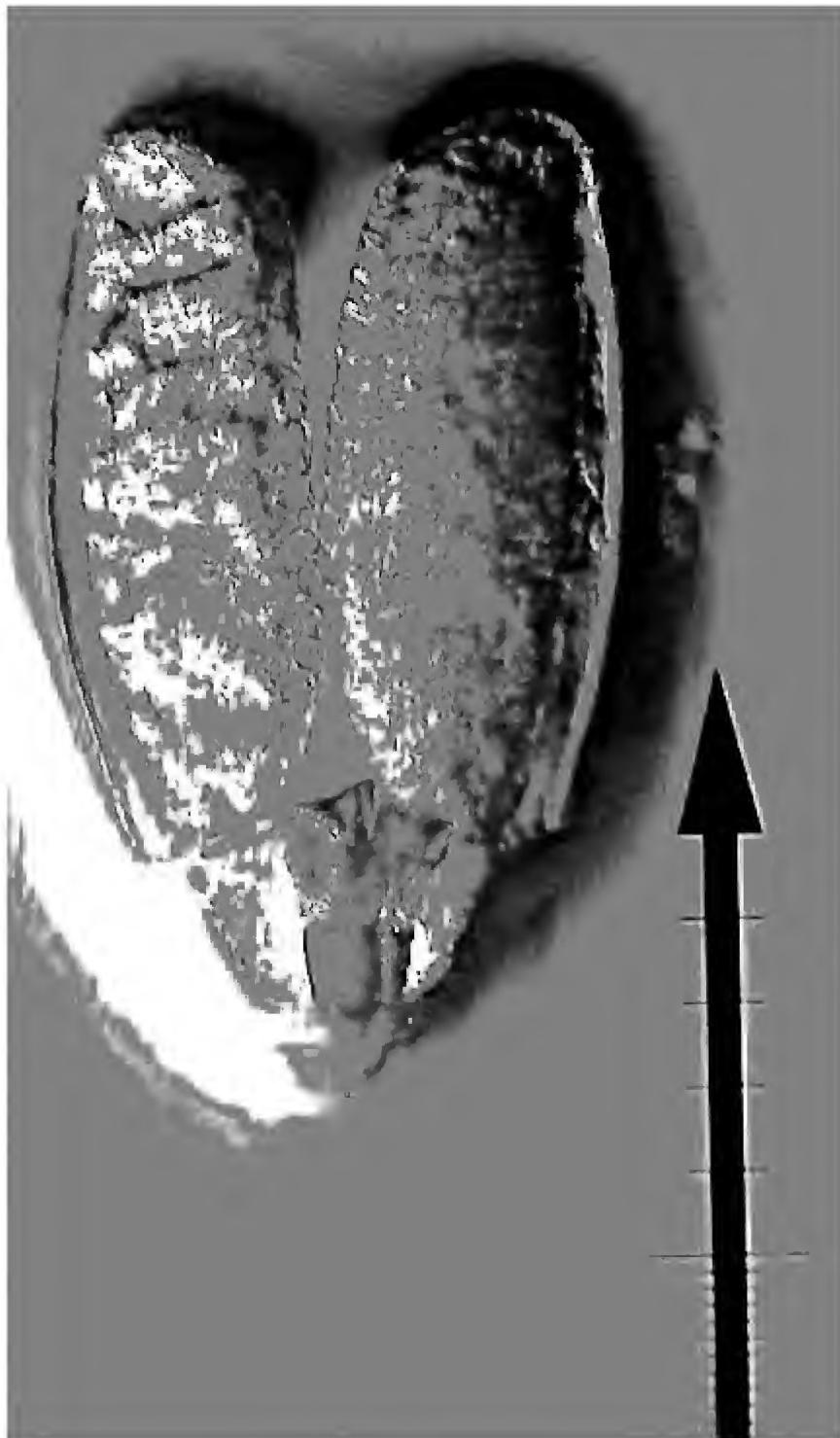
Translator/caudicle type:
d/o

Pollinia inner apex type: R

Caudicle bulb: C ?

Retinacula character: S

Hoya benstoneana Kloppenburg, Siar, Mendoza, Guevarra &
Carandang 2013
ISSN #1655-3179 Type clone



Pollinarium
enlarged about
165x.

Pollinium
length 0.45 mm
widest 0.18 mm

Retinaculum
length 0.15 mm
shoulder 0.12 mm
waist 0.05 mm
hip 0.10 mm
ext. 0.03 mm

Translator
length 0.10 mm
depth 0.06 mm

Caudicle
bulb diam. 0.09 mm

Ratio: pol.l/w 2.5
pol.l/ret 3.0

Translator/caudicle type: d/o
Pollinia inner apex type: RT

Caudicle bulb: G
Retinacula character: S

Hoya marizae Kloppenburg & Mendoza
(unpublished) GM #27



Pollinaria enlarged ca. 150x

Pollinium: length 0.45 mm; widest 0.18 mm

Retinaculum: length 0.19 mm; shoulder 0.14 mm; waist & hip 0.09 mm; ext. 0.04 mm

Translator: length 0.10 mm; widest 0.06 mm

Caudicle bulb diam: 0.06 mm

Translator/caudicle type: d/o

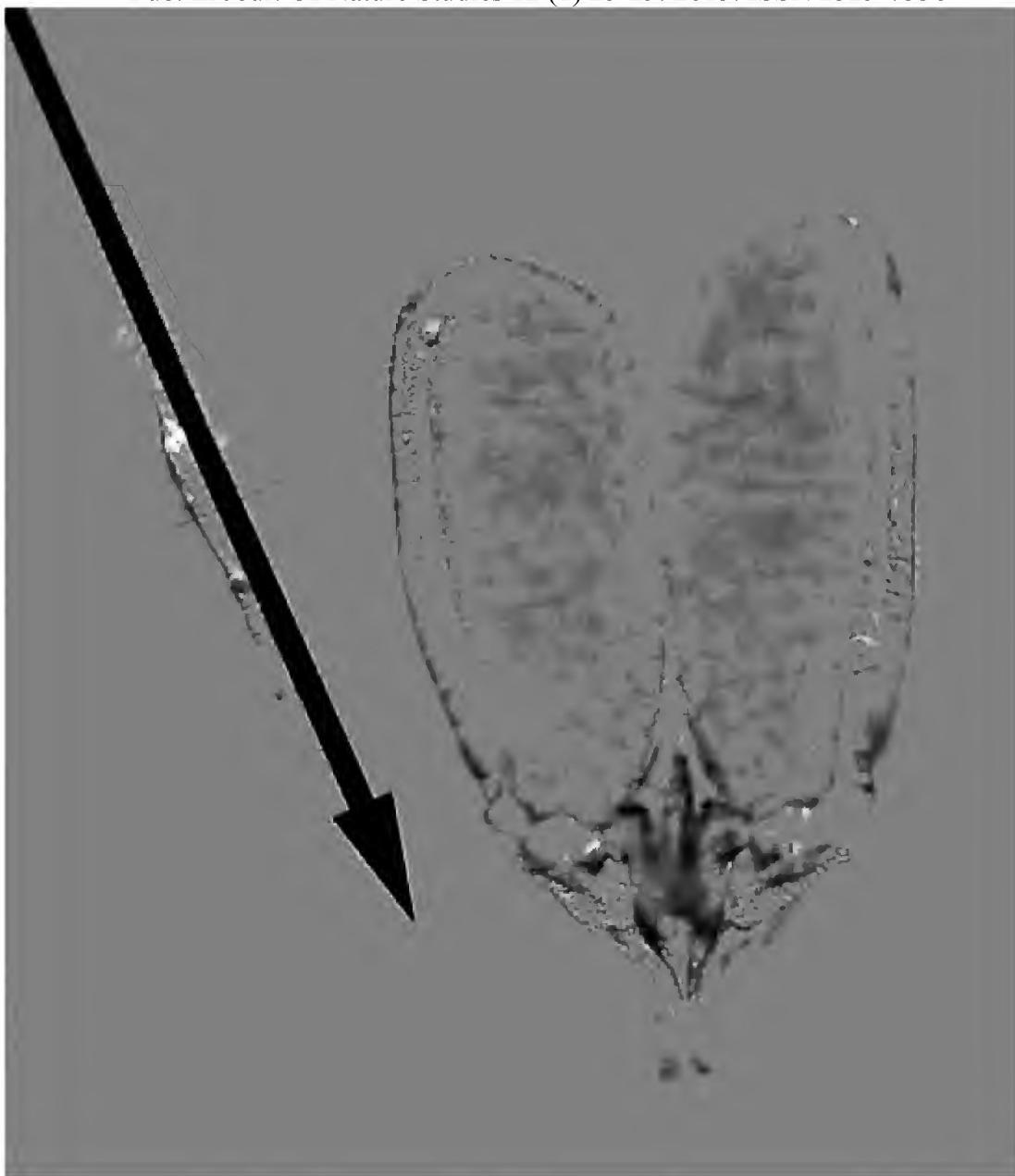
Pollinia end type: RT

Caudicle bulb: G

Retinacula character: S

***Hoya persicina* subsp. *rosea* Kloppenburg, Mendoza & Ferreras**

Pub. In Jour. Of Nature Studies 12 (1) 25-29. 2013. ISSN 2329-7336



Pollinaria enlarged ca. 189x

Pollinia inner end type: R

Pollinaria

length	0.45 mm
widest	0.18 mm

Translator

length	0.11 mm
widest	0.04 mm

Translator/caudicle type: d/o

Caudicle bulb: G **Retinacula character:** S

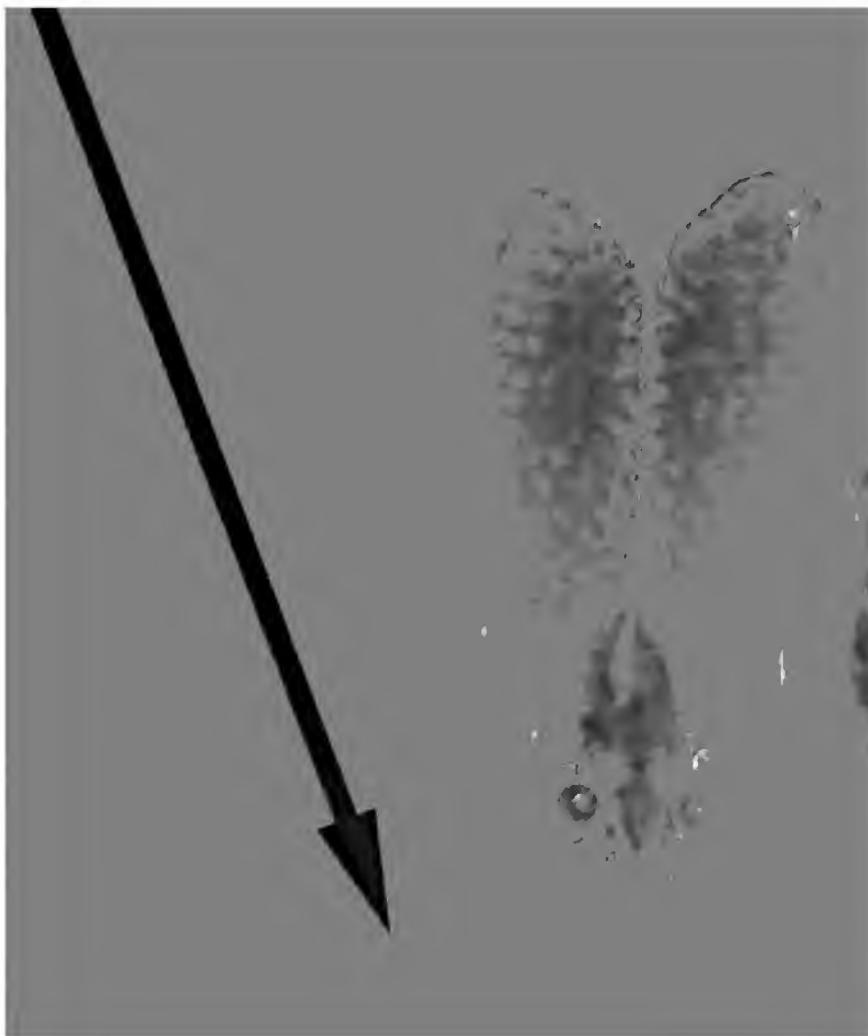
Retinaculum

length	0.15 mm
shoulder	0.12 mm
waist	0.07 mm
hip	0.08 mm
ext.	0.07 mm

Caudicle bulb diameter 0.06 mm

***Hoya crassicaulis* subsp. *mendozae* Kloppenburg**

(unpublished) GM #6 or #127 ?



Pollinarium
enlarged ca. 152x.

Pollinium
length 0.45 mm
widest 0.12 mm

Retinaculum
length 0.20 mm
shoul. 0.09 mm
waist 0.04 mm
hip 0.05 mm
ext. 0.04 mm

Translator
length 0.10 cm
depth 0.03 mm

Caudicle
bulb 0.05 mm

Translator/caudicle Type: d/o

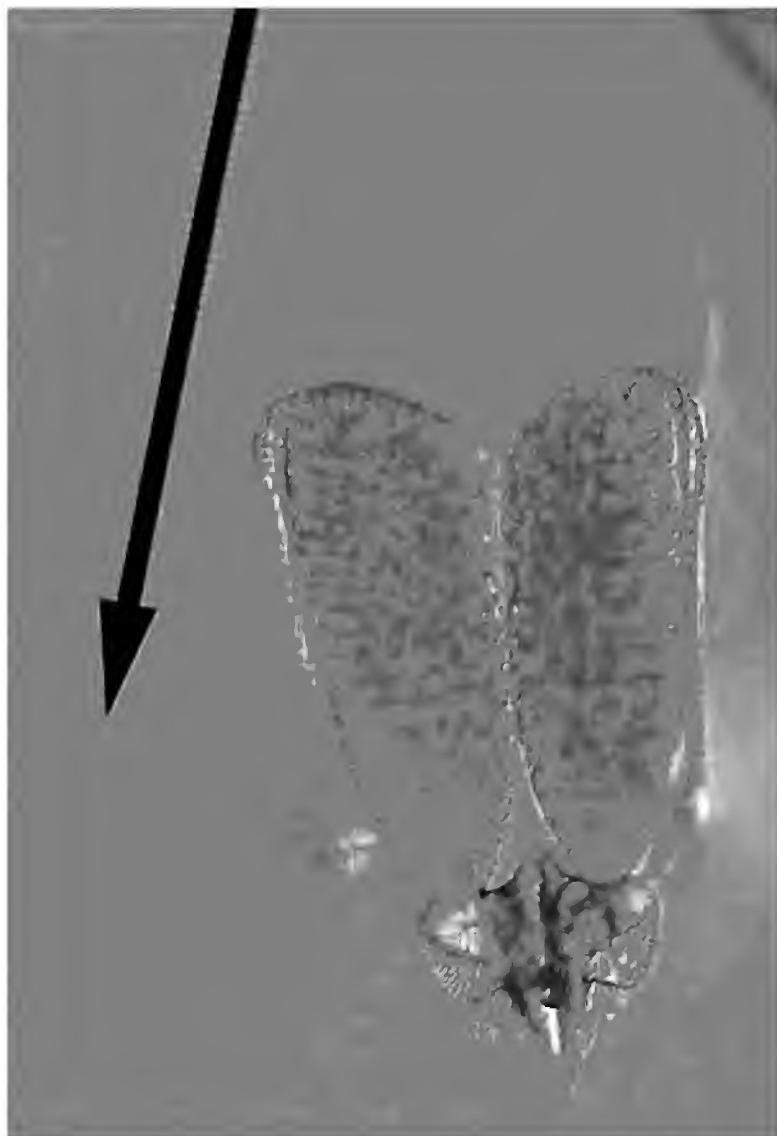
Ratios: p/w 3.8 p/r 2.3

Pollinia apex type: T

Caudicle bulb: G

Retinacula character: HE

***Hoya persicina* subsp. *inawaensis* Kloppenburg & Mendoza
(unpublished) GM #146**



Pollinaria enlarged 140x.

Pollinium

length	0.45 mm
widest	0.20 mm

Retinaculum

length	0.15 mm
shoulder	0.15 mm
waist	0.06 mm
hip	0.09 mm
ext.	0.05 mm

Translator

length	0.10 mm
widest	0.05 mm

Caudicle

bulb diam.	0.06 mm
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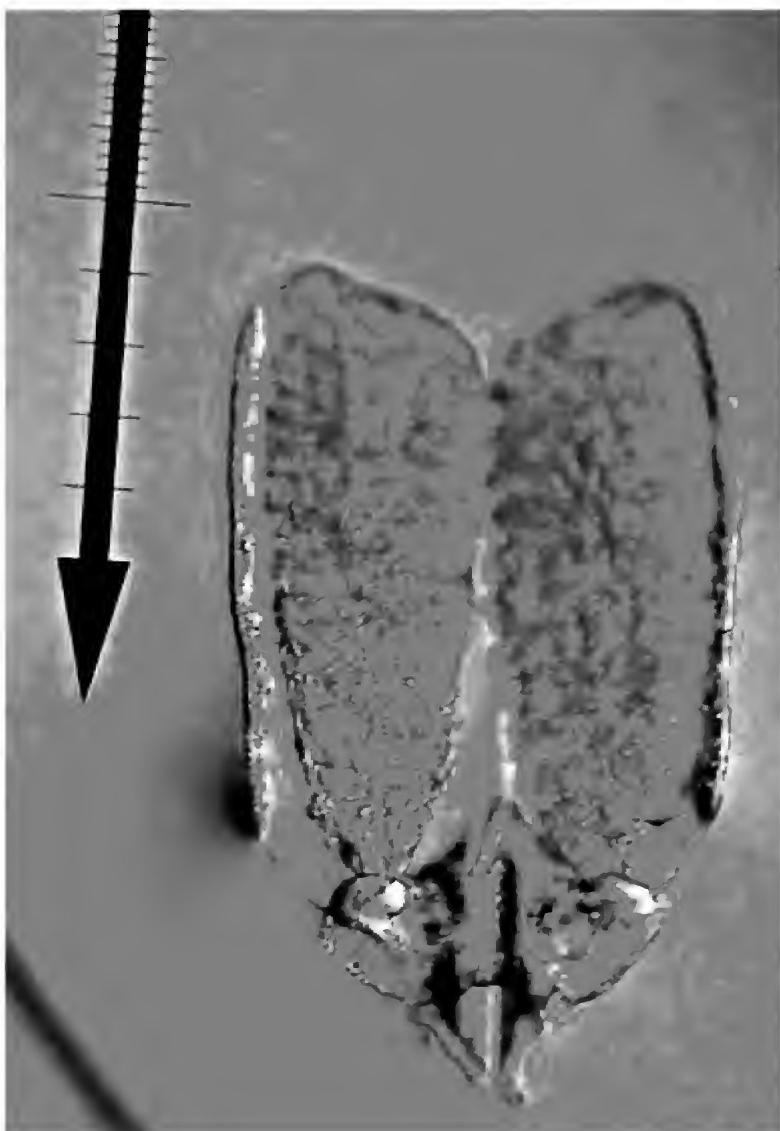
Translator/caudicle type:
d/o

Pollinia apex type: R

Caudicle bulb: G

Retinacula character: S

***Hoya auripigmenta* subsp. *papillata* Kloppenburg & Mendoza
(unpublished) GM #162**



Pollinaria enlarged 280x

Pollinium

length	0.45 mm
widest	0.20 mm

Retinaculum

length	0.13 mm
shoulder	0.15 mm
waist	0.07 mm
hip	0.11 mm
ext.	0.08 mm

Translator

length	0.10 mm
widest	0.09 mm

Caudicle

bulb diam.	0.06 mm
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Translator/caudicle type:
d/o

Pollinia apex type: F

Caudicle bulb: C

Retinacula character: S

Hoya cardiophylla Merrill 1920

Flowered at Fresno, CA. from clone #910301 DH.
cupped coronal lobes.



Magnified approximately 165x.

Pollinium

length:	0.45 mm
widest:	0.14 mm

Retinaculum

length:	0.18 mm
shoulder:	0.07 mm
waist:	0.05 mm
hip:	0.08 mm
ext.:	0.08 mm

Translators

length:	0.10 mm
depth:	0.04 mm

Caudicle

bulb diam.: 0.06 mm

Type: C

Translator/caudicle type: d/o

Pollinia apex type: RT

Retinacula character: LS

***Hoya velasioii* subsp. *grandiora* Kloppenburg 2015**

CAHUP 18682 JP Determined to be same as DH 910301.



Pollinarium enlarged about 165x. Pollinia are laying slanted so full extent of breadth can not be measured in this photo.

Pollinium

length	0.45 mm
widest	0.13 mm

Retinaculum

length	0.20 mm
shoulder	0.08 mm
waist	0.04 mm
hip	0.08 mm
ext.	0.03 mm

Translator

length	0.07 mm
depth	0.01 mm

Caudicle bulb is here oval
0.03 x 0.06 mm

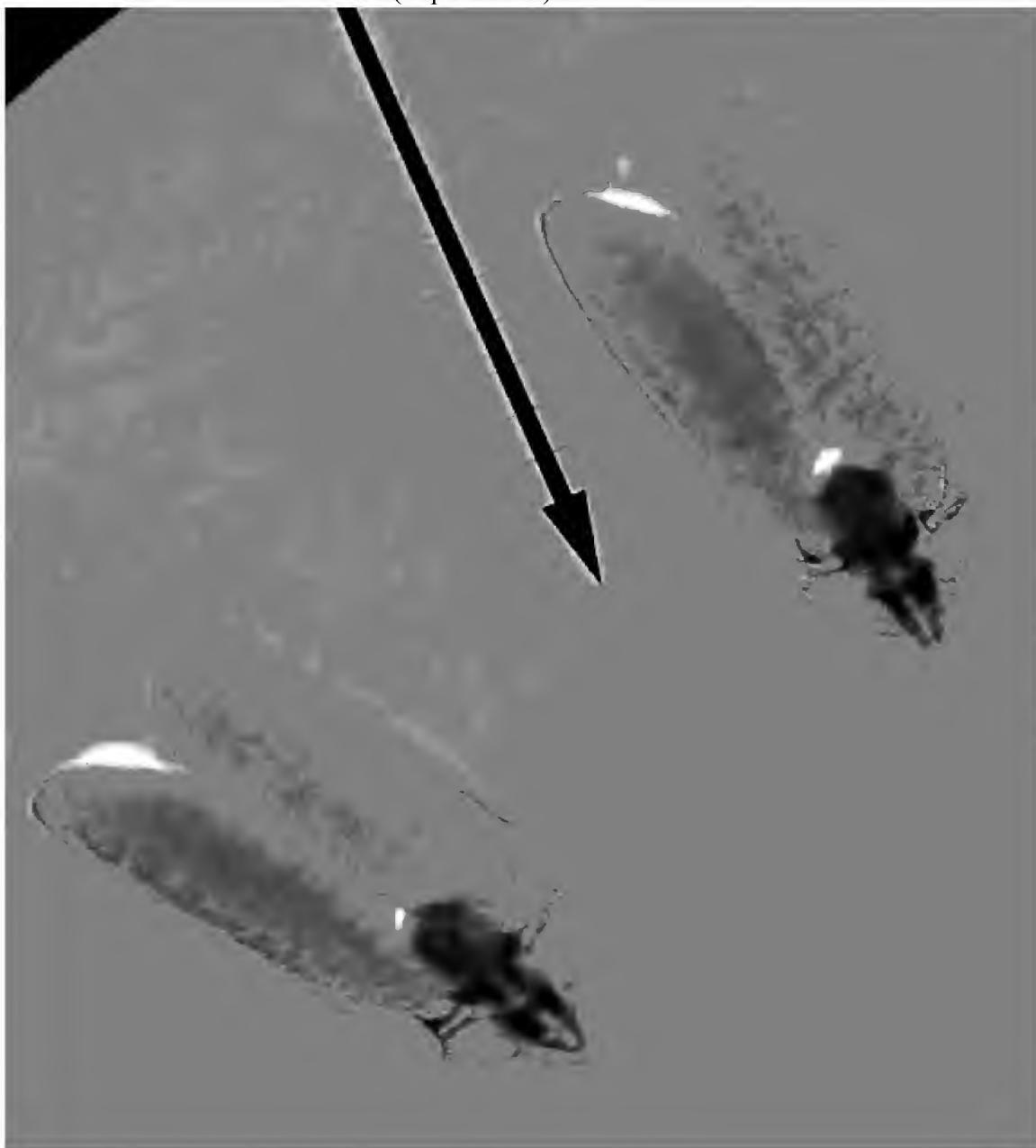
Translator/caudicle type: d/o

Pollinia apex type: R

Caudicle bulb: ?

Retinacula character: LS

Hoya bicolor subsp. polilloensis Kloppenburg & Mendoza
(unpublished) GM #23



Pollinium: length 0.45 mm widest 0.15 mm

Retinaculum: length 0.20 mm shoulder 0.09 mm waist 0.05 mm hip 0.08 mm
extensions 0.04 mm

Translators: length 0.10 mm widest 0.06 mm

Caudicle bulb diam. 0.04 mm

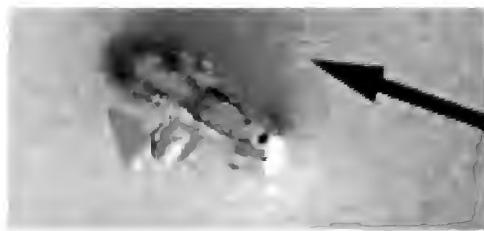
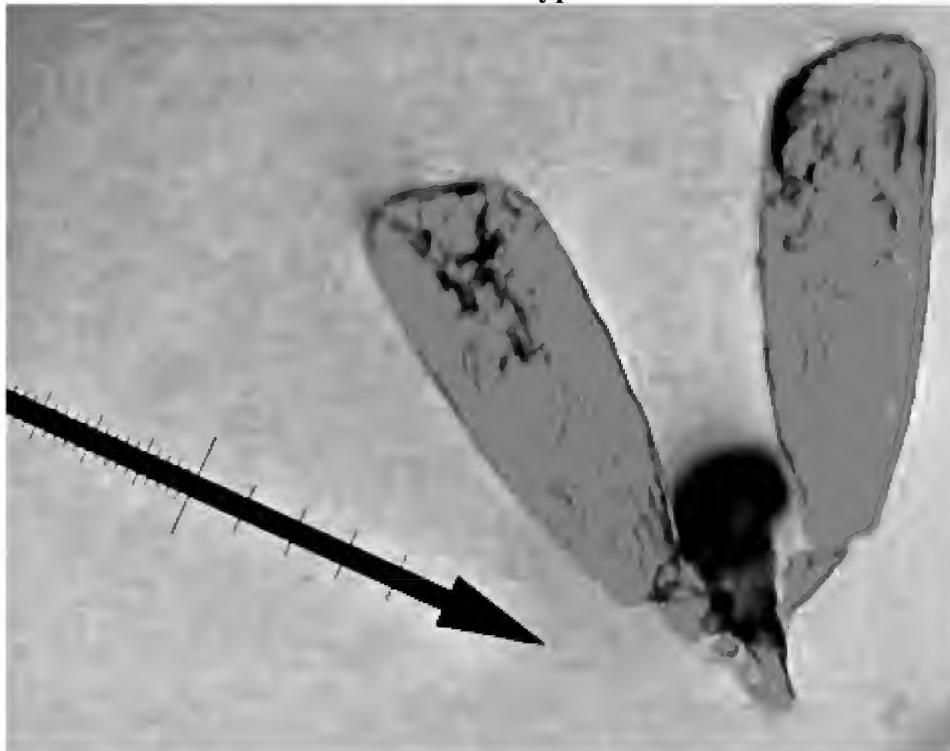
Pollinia inner end: RT

Translator/caudicle type: d/o

Caudicle bulb: G

Retinacula character: LS

Hoya alwitriana Kloppenburg, Siar, Guevarra & Carandang 2012
Type clone



Pollinarium above enlarged about 150x
This species was difficult as the long retinaculum with the translators attached well down from the long inner head tended to twist and rise off the slide. Pict. #2 is of the retinaculum and shows how long the inner end is.

Pollinium

length	0.44 mm
widest	0.17 mm

Ratios: pollinium length/widest 2.6

Translator/caudicle type: d/o

Retinaculum

length	0.19 mm
shoulder	0.08 mm
hip	0.06 mm
waist	0.07 mm
ext.	0.06 mm

Pollinia inner end: T

Translators

length	0.09 mm
--------	---------

Retinacula character: LS

Caudicle

bulb. diam.	0.05 mm
-------------	---------

* the caudicle end to which the pollinia basal end is stuck (in this case a clear ovate ball)

Type: C

***Hoya aurantiaca* subsp. *lagyoensis* Kloppenburg & Mendoza**



Pollinaria enlarged ca.
160x.

Pollinium

length	0.44 mm
widest	0.20 mm

Retinacula

length	0.14 mm
shoulder	0.13 mm
waist	0.08 mm
hip	0.10 mm
ext.	0.04 mm

Translator

length	0.10 mm
widest	0.05 mm

Caudicle

bulb diam.	0.05 mm
------------	---------

Translator/caudicle type:
d/o

Pollinia inner end type: T

Retinacula type: S

Hoya bakyaanensis Kloppenburg & Mendoza
(unpublished) GM #149



Pollinaria enlarged 150x.

Pollinium

length	0.44 mm
widest	0.20 mm

Retinaculum

length	0.10 mm
shoulder	0.15 mm
waist	0.05 mm
hip	0.09 mm
ext.	0.06 mm

Translator

length	0.11 mm
wide	0.04 mm

Caudicle

bulb	0.06 mm
------	---------

Translator/caudicle type:
d/o

Pollinia apex type: R

Caudicle bulb: C

Retinacula character: S

Hoya sp. EG 06097
Flower 9/8/00 at Pearl City, Hawaii.



Pollinaria enlarged about 165x.

Pollinia

length	0.44 mm
widest	0.16 mm

Retinaculum

length	0.13 mm to ext.
shoulder	0.10 mm
waist	0.07 mm
hip	0.08 mm
extensions	0.07 mm

Translator

length	0.07 mm
depth	0.05 mm
width	0.01 mm

Caudicle

bulb diam.	0.06 mm
------------	---------

Translator/caudicle type: d/o

Pollinia apex type: RT

Caudicle bulb: C

Retinacula character: S

Hoya latifolia ?

From Ric Moreia, St. Petersburg, Florida



Pollinia

length	0.44 mm
widest	0.15 mm

Retinacula

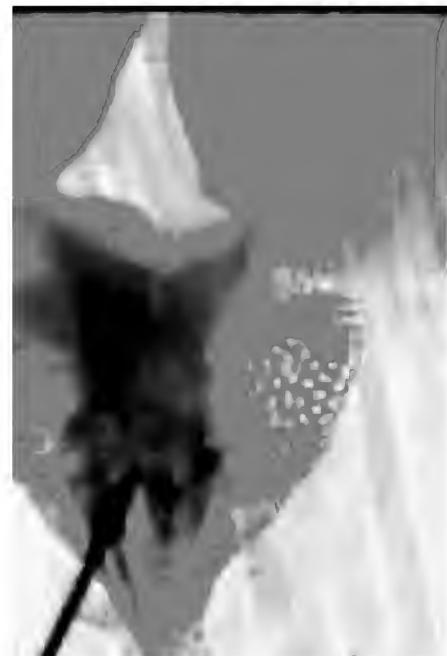
length	0.12 mm
shoulder	0.10 mm
waist	0.05 mm
hip	0.09 mm
ext.	0.07 mm

Translators

length	0.11 mm
depth	0.06 mm
width	0.01 mm

Caudicle

bulb diam.	0.05 mm
------------	---------



Another view showing the translator in detail.

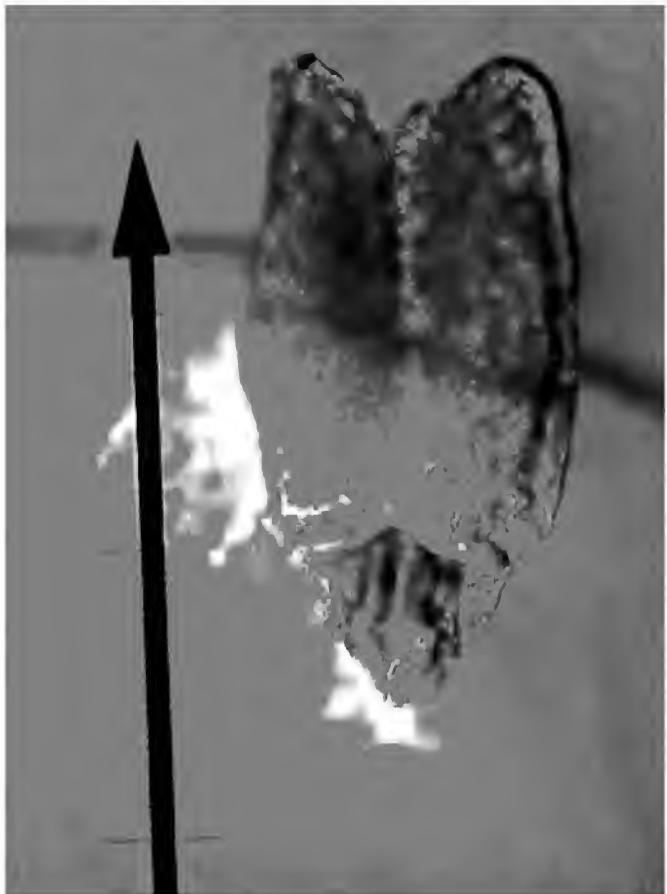
Translator/caudicle type: d/o

Pollinia inner apex type: T

Caudicle bulb: G

Retinacula character: HU

Hoya armeniaca Kloppenburg & Mendoza
(unpublished) GM #54



Pollinarium enlarged ca.
120x.

Pollinium

length	0.43 mm
widest	0.15 mm

Retinaculum

length	0.12 mm
shoulder	0.12 mm
waist	0.10 mm
hip	0.11 mm
ext.	0.03 mm

Translator

length	0.07 mm
depth	0.04 mm

Caudicle

bulb diam.	0.07 mm
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Translator/caudicle type: d/o

Pollinia inner end type: RT

Caudicle bulb: G

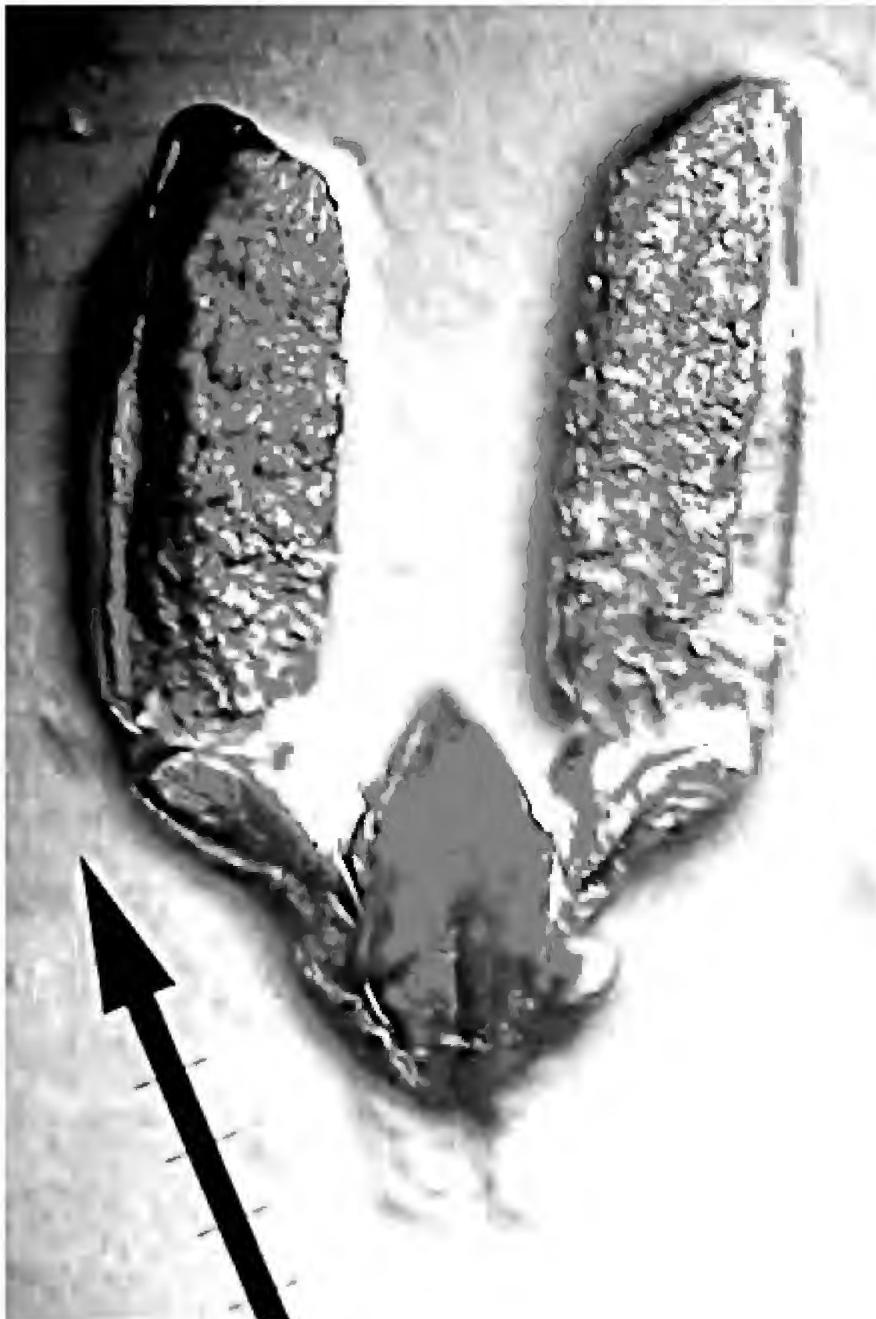
Retinacula character: S

Pollinia Types 2018-4B
d/o

91. **Hoya lucardenasiana** Kloppenburg & Siar 2009
92. **Hoya polilloensis** Kloppenburg, Guevarra, Mendoza & Ferreras 2013
93. **Hoya marizae** Kloppenburg & Mendoza
94. **Hoya sp. PNH 11859**
95. **Hoya sp. NS05-206**
96. **Hoya annaleesoligamae** Kloppenburg 2017
97. **Hoya gelba** Kloppenburg, Guevarra & Carandang 2013
98. **Hoya katherinechallisiana** Kloppenburg & Mendoza
99. **Hoya persicina** subsp. **tagumpayensis** Kloppenburg & Mendoza
100. **Hoya persicina** subsp. **tingkoyanensis** Kloppenburg & Mendoza
101. **Hoya blashernaezii** subsp. **tingkoyanensis** Kloppenburg & Mendoza
102. **Hoya eburna** Kloppenburg, Guevara & Carandang 2013
103. **Hoya cremora** Kloppenburg & Mendoza
104. **Hoya faoensis** Kloppenburg & Siar 2008
105. **Hoya sp. CAHUP 5967**
106. **Hoya retusa** Dalzell 1852
107. **Hoya sp. PNH 4854**
108. **Hoya sp. W 8508**
109. **Hoya renuncola** Kloppenburg & Mendoza
110. **Hoya markoi** Kloppenburg & Mendoza
111. **Hoya blashernaezii** subsp. **inawaensis** Kloppenburg & Mendoza
112. **Hoya blashernaezii** subsp. **infantaensis** Kloppenburg & Mendoza
113. **Hoya blashernaezii** subsp. **lagyoensis** Kloppenburg & Mendoza
114. **Hoya blashernaezii** subsp. **straminea** Kloppenburg & Mendoza
115. **Hoya blashernaezii** subsp. **tangerina** Kloppenburg & Mendoza
116. **Hoya blashernaezii** subsp. **truncata** Kloppenburg & Mendoza
117. **Hoya blashernaezii** subsp. **tagumpayensis** Kloppenburg & Mendoza
118. **Hoya blashernaezii** subsp. **lalawinanensis** Kloppenburg & Mendoza
119. **Hoya querinoensis** Kloppenburg & Siar 2007
120. **Hoya blashernaezii** subsp. **nuevavizcayensis** Kloppenburg & Mendoza
121. **Hoya lagyaensis** Kloppenburg & Mendoza
122. **Hoya afuangae** Kloppenburg & Cajano
123. **Hoya polystachya** Blume 1849
124. **Hoya moninae** Kloppenburg & Cajano 2014
125. **Hoya mamagongensis** Kloppenburg & Mendoza
126. **Hoya ferrerasii** Kloppenburg & Siar 2010
127. **Hoya tagumpayensis** Kloppenburg & Mendoza
128. **Hoya blashernaezii** subsp. **siariae** Kloppenburg 2014
129. **Hoya kamgongensis** Kloppenburg & Mendoza
127. **Hoya blashernaezii** subsp. **vadacorolla** Kloppenburg & Mendoza
128. **Hoya eburna** subsp. **infantaensis** Kloppenburg & Mendoza
129. **Hoya sp. CAHUP 5269**

130. ***Hoya sulu-anensis*** Kloppenborg & Mendoza
131. ***Hoya blashernaezii* subsp. *mendozai*** Kloppenborg
132. ***Hoya lambioae*** Kloppenborg, Guevarra, Cajano, & Carandang 2015
133. ***Hoya blashernaezii* subsp. *armerina*** Kloppenborg & Mendoza
134. ***Hoya* sp.** IPPS 8860
135. ***Hoya tomataensis*** Green and Kloppenborg 2004
136. ***Hoya blashernaezii* subsp. *kamagongensis*** Kloppenborg & Mendoza
137. ***Hoya blashernaezii* subsp. *parviora*** Kloppenborg & Mendoza
138. ***Hoya blashernaezii* subsp. *nagcarlanensis*** Kloppenborg & Mendoza
139. ***Hoya blashernaezii* subsp. *simeonae*** Kloppenborg & Mendoza
140. ***Hoya polystachya alba***
141. ***Hoya salmonea*** Kloppenborg, Guevarra, Mendoza & Ferreras 2013
142. ***Hoya salmonea* subsp. *pallida*** Kloppenborg, Mendoza & Ferreras 2013
143. ***Hoya blashernaezii* subsp. *luzonensis*** Kloppenborg & Mendoza
144. ***Hoya blashernaezii* subsp. *rosea*** Kloppenborg
145. ***Hoya bifunda* subsp. *obtusa*** Kloppenborg & Mendoza
146. ***Hoya nakarensis*** Kloppenborg, Mendoza & Ferreras 2013
147. ***Hoya albida*** Kloppenborg, Cajano, Guevarra & Carandang 2013
148. ***Hoya maubanensis*** Kloppenborg & Mendoza
149. ***Hoya williamsiana*** Klopp., Siar, Mendoza, Cajano, Guevarra & Carandang 2013

***Hoya lucardenasiana* Kloppenburg & Siar 2009 Type clone**



Translator/caudicle type: d/o

Pollinia inner end type: T

Caudicle bulb: ?

Retinacula character: HE

Pollinarium
enlarged about
165x.

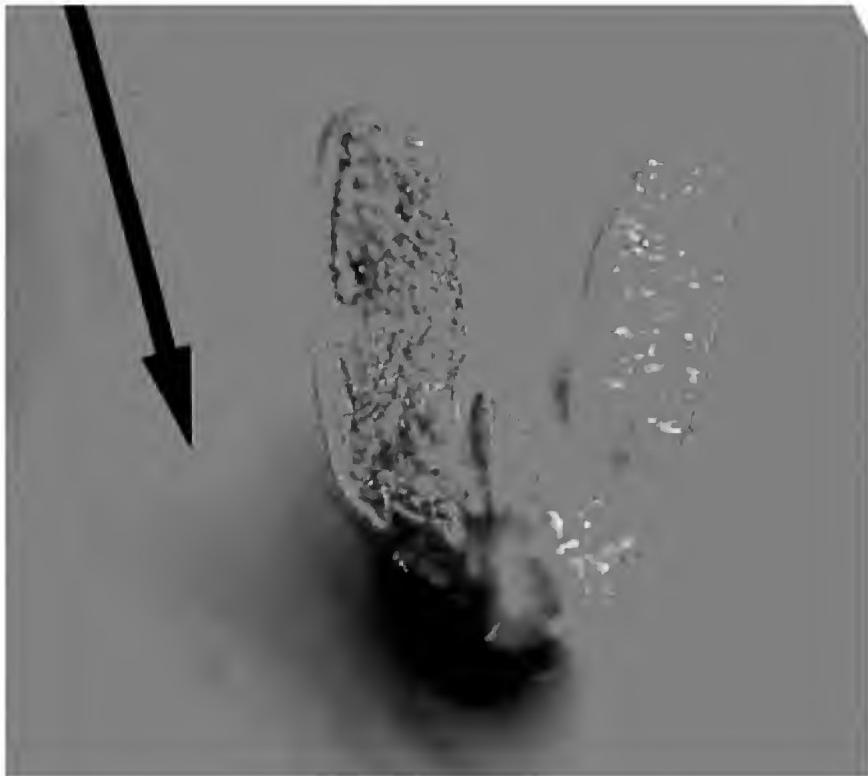
Pollinium
length 0.43 mm
widest 0.14 mm

Retinaculum
length 0.23 mm
shoulder 0.13 mm
waist 0.12 mm
hip 0.13 mm
ext. 0.05 mm

Translator
length 0.14 mm
depth 0.03 mm

Caudicle bulb
diam. 0.08 mm

***Hoya polilloensis* Kloppenburg, Guevarra, Mendoza & Ferreras
2013**



Pollinaria
enlarged ca. 160x.

Pollinaria

length 0.43 mm
widest 0.16 mm

Retinaculum

length 0.19 mm
shoulder 0.07 mm
waist 0.06 mm
hip 0.07 mm
ext. 0.03 mm

Translator

length 0.07 mm
depth 0.03 mm

Caudicle

bulb diam. 0.06 mm

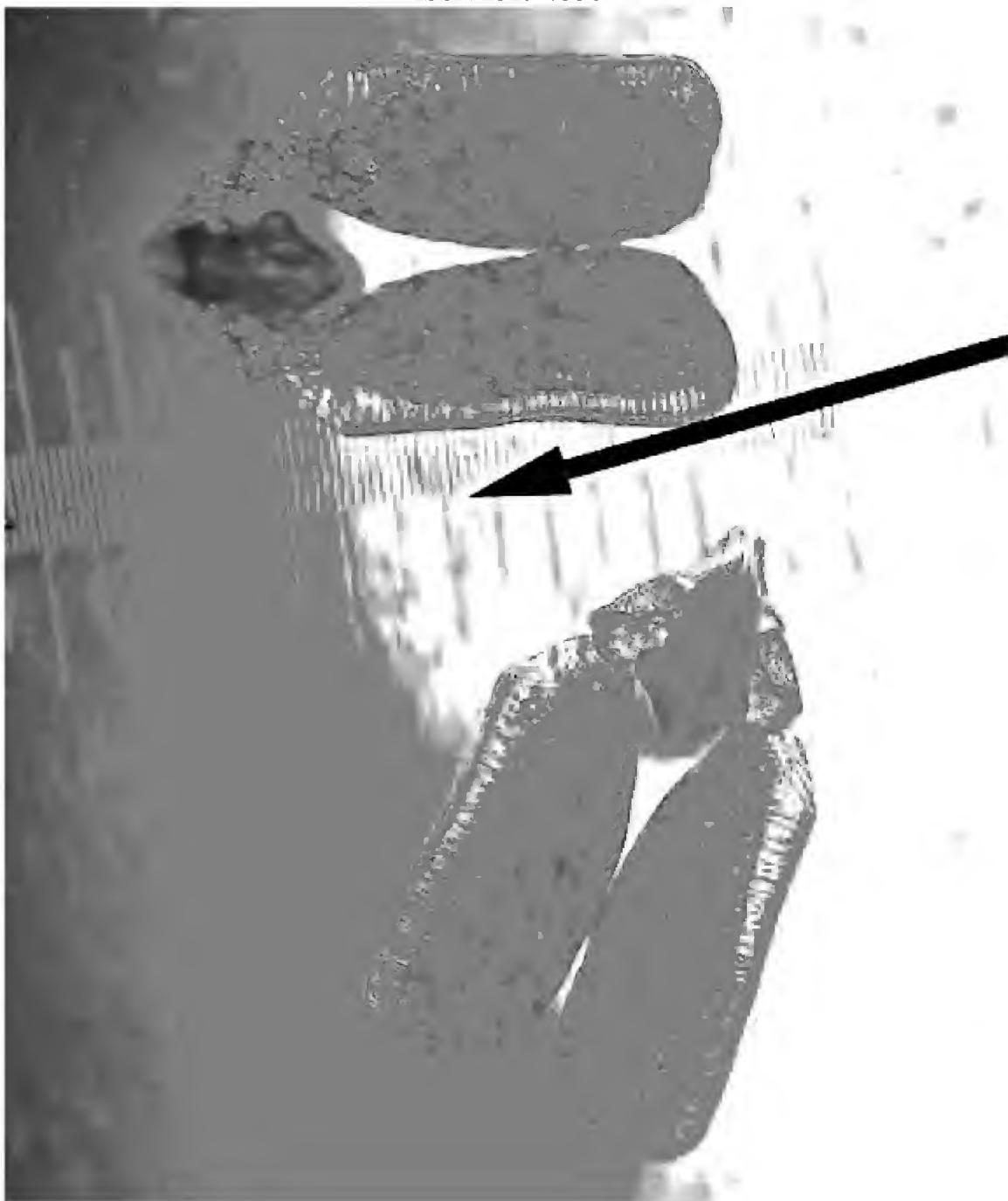
Type: G

Translator/caudicle type: d/o

Pollinia inner end type: R

Caudicle bulb: G

Retinacula character: E



Pollinaria enlarged ca. 150x

Pollinium: length 0.45 mm; widest 0.18 mm

Retinaculum: length 0.19 mm; shoulder 0.14 mm; waist & hip 0.09 mm; ext. 0.04 mm

Translator: length 0.10 mm; widest 0.06 mm

Caudicle bulb diam: 0.06 mm G **Retinacula:** S

Translator/caudicle type: d/o **Pollinia end type:** R/T

Hoya sp. PNH 11859

Species found by G. E. Edano 12 March 1950 at Antilao River, Ormoc. Leyte, Philippines. Field No. 2018, along a ridge in forest, elevation 500 meters. Flower green, fruit green.

Pollinarium enlarged about 110x Pollinia outer apices taper inwardly.



Pollinia

length	0.43 mm
widest	0.13 mm

Retinaculum

length	0.23 mm
shoulder	0.09 mm
waist	0.03 mm
hip	0.06 mm
extensions	rudimentary.

Translator

length	0.07 mm
depth	0.02 mm.

Caudicle

bulb diam.	0.06 mm.
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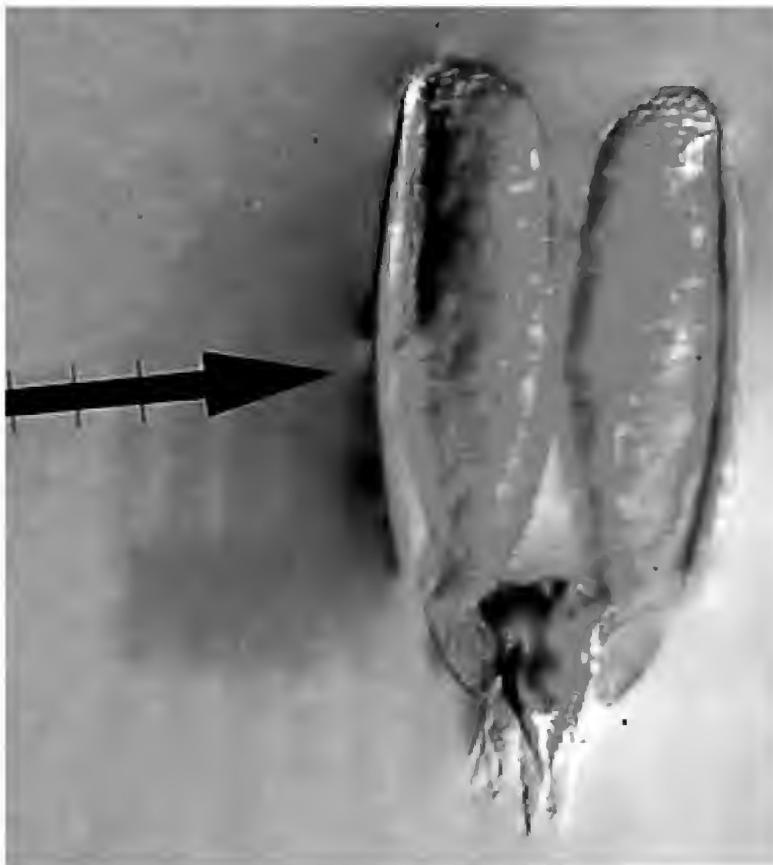
Translator/caudicle type: d/o

Pollinia inner end type: F

Caudicle bulb: ?

Retinacula character: LS

Hoya sp. NS05-206



Pollinaria enlarged about 165x.

Scale: black arrow lines on stem are 0.05 mm. as is the base of the head. Arrow is 0.10 mm. long,

The pellucid edge runs over the rounded inner end of the pollinia and well down the sides to just above where they pollinium is stuck into the clear caudicle bulb.

Extensions arise from the hip sides and here are well developed. Measured only the dark portion below.

Pollinarium:

length	0.42 mm
widest	0.14 mm

Retinaculum:

length	0.11 mm
shoulder	0.11 mm
waist	0.07 mm
hip	0.08 mm
ext.	0.06 mm

Translators:

length	0.09 mm
depth	0.05 mm

Caudicle:

bulb diam.	0.06 mm
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Caudicle bulb: ?

Ret.: pol. ratio 1:3.1

Translator/caudicle: d/o

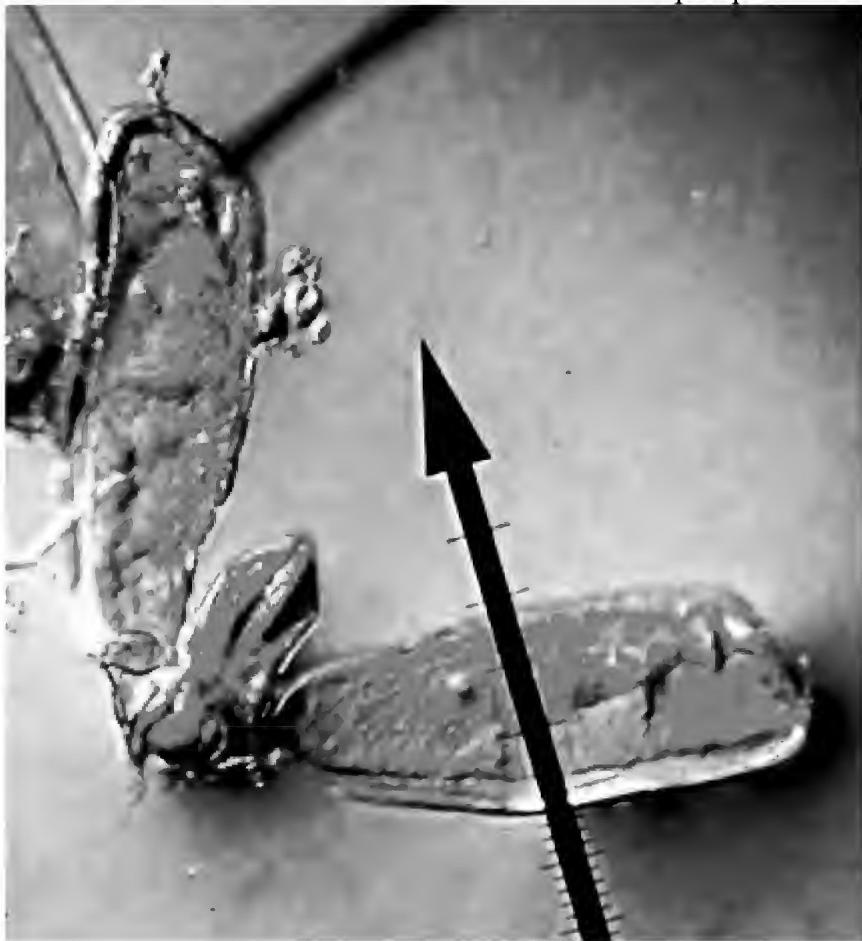
Retinacula character: S

Pollinia inner end type: R

Hoya annaleesoligamae Kloppenburg 2017

CAHUP 63927

23 Oct. 2006: see 81100 = quinquinervia



7

Pollinarium
enlarged about
165x.

Pollinium

length	0.42 mm
widest	0.15 mm

Retinaculum

length	0.18 mm
shoulder	0.07 mm
waist	0.04 mm
hip	0.07 mm
ext.	0.04 mm

Ratio: ret length/ poll. length 3.2
pol. width/pol. length 2.8

Translators

length	0.04 mm
depth	0.02 mm

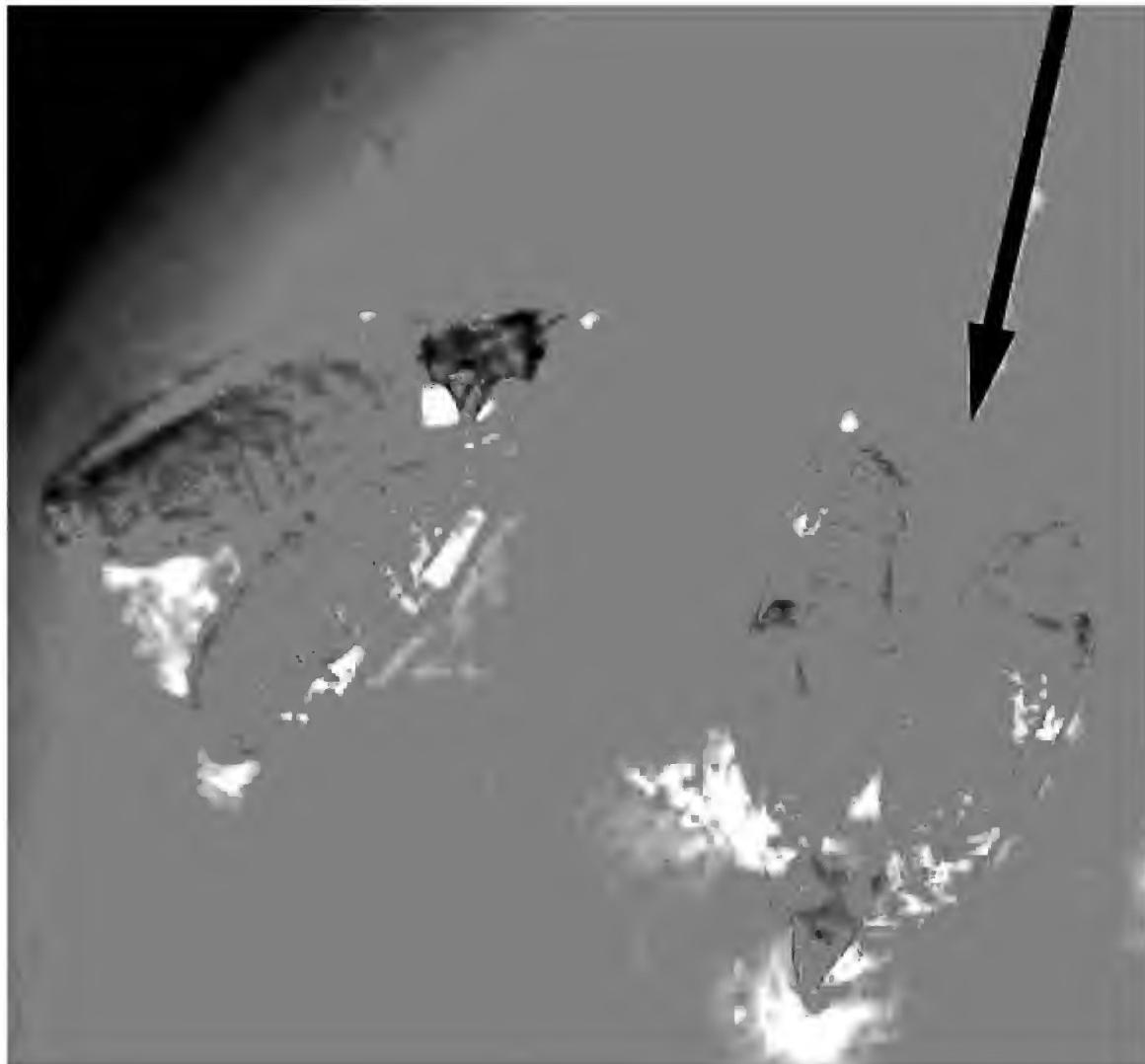
Translator/caudicle: d/o
Pollinia inner end type: F
Caudicle bulb: C
Retinacula character: LS

Caudicle

bulb diam.	0.05 mm
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***Hoya gelba* Kloppenburg, Guevarra & Carandang 2013 Type clone**

Pollinaria enlarged about 200x.



Pollinium

length	0.42 mm
widest	0.18 mm

Caudicle

bulb diam. 0.05 mm

Retinaculum

length	0.17 mm
shoulder	0.10 mm
waist	0.05 mm
hip	0.07 mm
ext.	0.04 mm

Retinacula character: HU

Translator/caudicle: d/o

Pollinia inner end type: R

Caudicle bulb: G

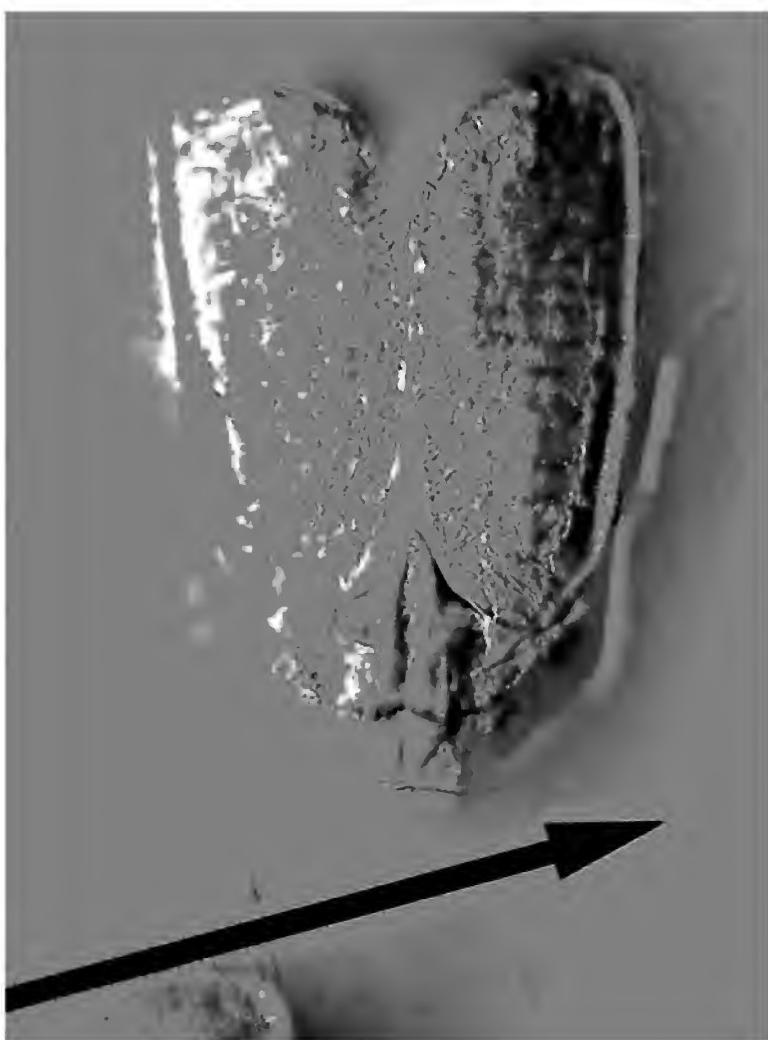
Ratio: pol./widest 2.3

pol./ret. 2.0

Translator

length	0.08 mm
depth	0.03 mm

Hoya katherinechallisiana Kloppenburg & Mendoza
(unpublished) GM #150



Pollinaria enlarged ca.
150x.

Pollinium

length	0.42 mm
widest	0.20 mm

Retinaculum

length	0.14 mm
shoulder	0.16 mm
waist	0.08 mm
hip	0.11 mm
ext.	0.07 mm

Translator

length	0.10 mm
wide	0.03 mm

Caudicle

bulb diam.	0.06 mm
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Translator/caudicle type:
d/o

Pollinia apex type: R

Caudicle bulb: C

Retinacula character: S

***Hoya persicina* subsp. *tagumpayensis* Kloppenburg & Mendoza
(unpublished) GM #144**



Pollinaria enlarged 100x

Pollinium

length	0.42 mm
widest	0.19 mm

Retinaculum

length	0.12 mm
shoulder	0.15 mm
waist	0.07 mm
hip	0.09 mm
ext.	0.05 mm

Translator

length	0.10 mm
widest	0.04 mm

Caudicle

bulb diam.	0.05 mm
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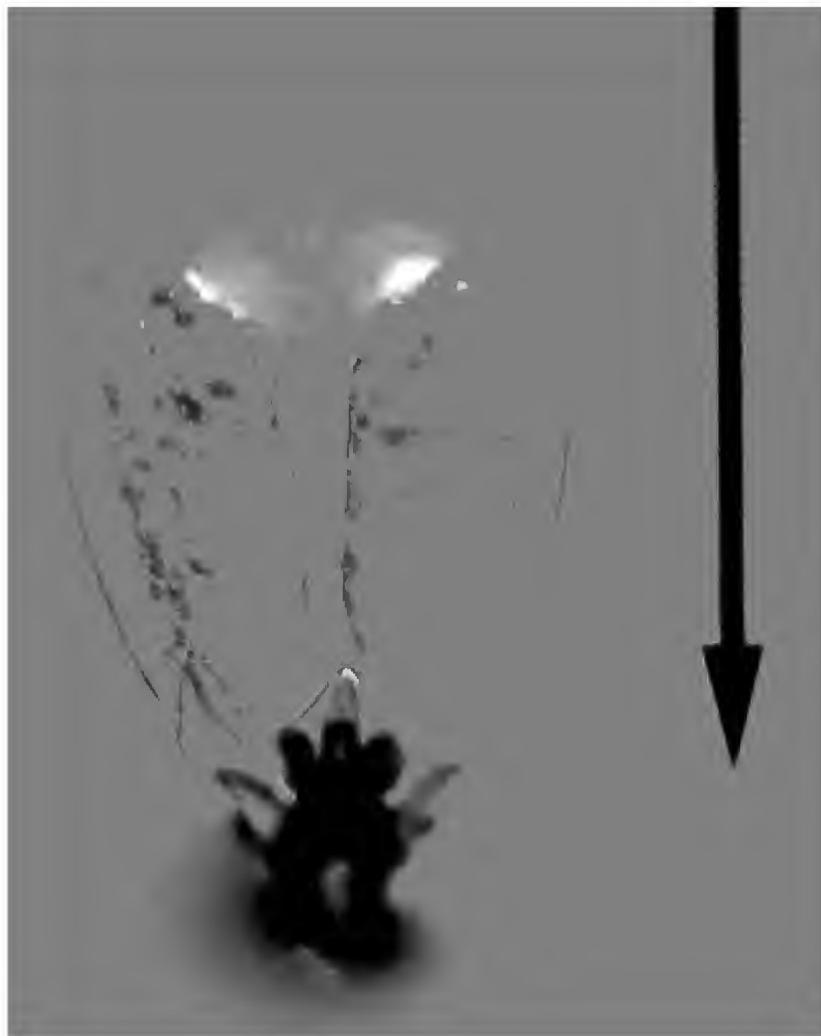
Translator/caudicle type:
ls/o but nearly d/o

Pollinia apex type: R

Caudicle bulb: C

Retinacula character: S

***Hoya persicina* subsp. *tingkoyanensis* Kloppenburg & Mendoza
(unpublished) GM #135**



Pollinaria enlarged
ca. 150x.

Pollinium

length	0.42mm
widest	0.19 mm

Retinaculum

length	0.16 mm
shoulder	0.12 mm
waist	0.08 mm
hip	0.11 mm
ext.	0.05 mm

Translator

length	0.10 mm
wide	0.03 mm

Caudicle

bulb diam.	0.05 mm
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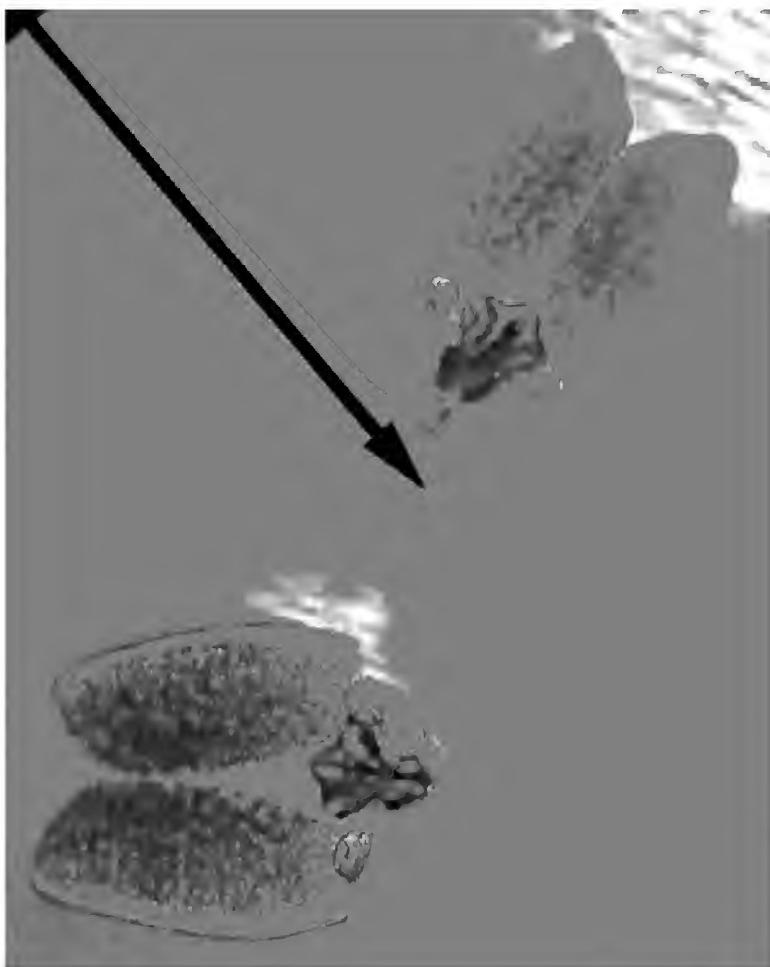
**Translator/caudicle
type:** d/o

Pollinia apex type: RT

Caudicle bulb: C ?

Retinacula character: S

***Hoya blashernaezii* subsp. *tingkoyanensis* Kloppenburg & Mendoza
(unpublished) GM #119**



Pollinaria enlarged ca.
90x.

Pollinium

length	0.42 mm
widest	0.19 mm

Retinaculum

length	0.15 mm
shoulder	0.14 mm
waist	0.05 mm
hip	0.07 mm
ext.	0.03 mm

Translator

length	0.10 mm
wide	0.02 mm

Caudicle

bulb diam.	0.05 mm
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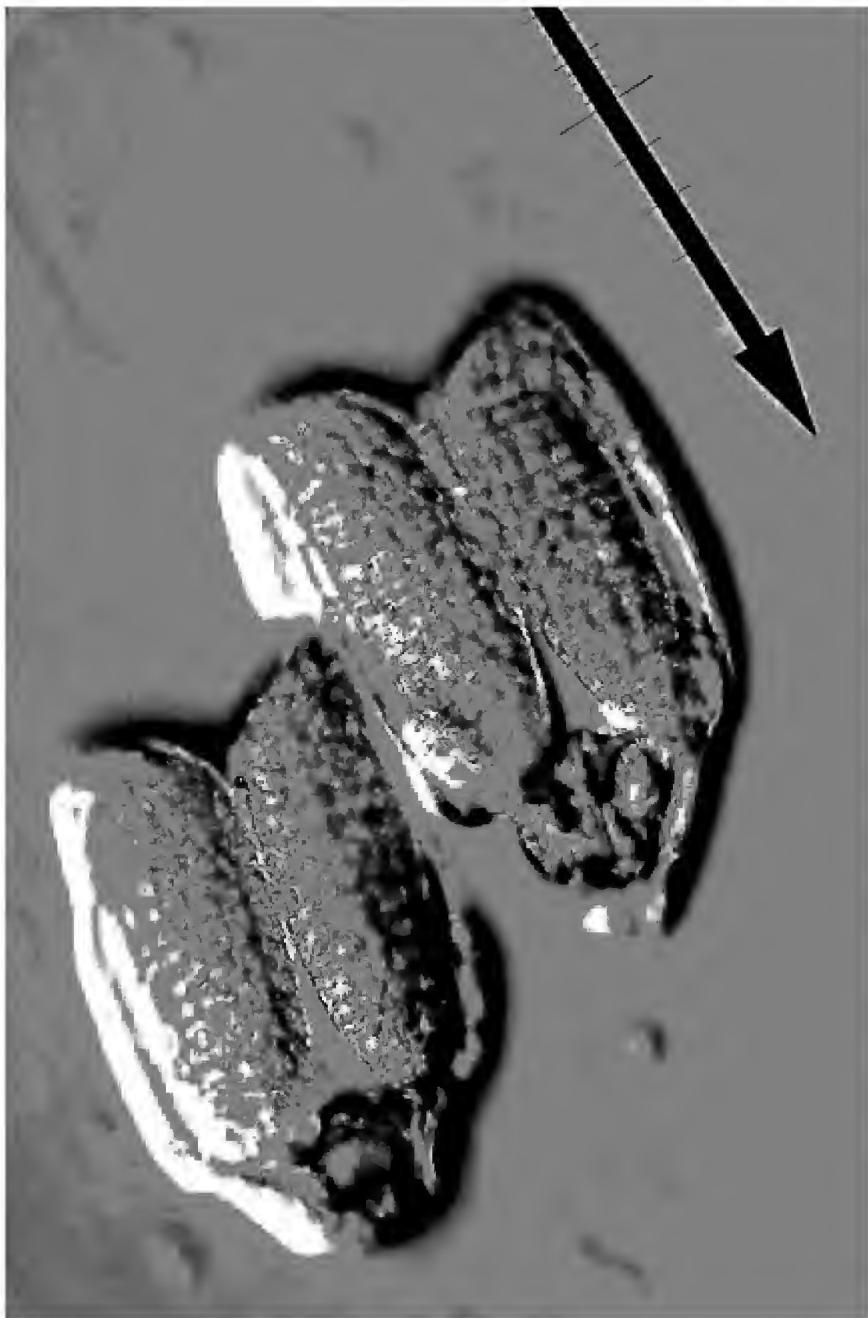
Translator/caudicle type: d/o

Pollinia inner apex type: T

Caudicle bulb: C

Retinacula character: S

Hoya eburna Kloppenburg, Guevara & Carandang 2013
Type clone



Pollinarium
enlarged ca. 140x.

Pollinium

length 0.41 mm
widest 0.18 mm

Retinaculum

length 0.16 mm
shoulder 0.12 mm
waist 0.06 mm
hip 0.08 mm
ext. 0.02 mm

Translator

length 0.11 mm
widest 0.05 mm

Caudicle

bulb diam. 0.05 mm

Translator type:
d/o

Pollinia inner apex
type: RT

Caudicle bulb: G

Retinacula
character: S

Hoya cremora Kloppenburg & Mendoza
(unpublished) GM #52



Pollinarium enlarged ca,
150x.

Pollinium

length	0.41 mm
widest	0.19 mm

Retinaculum

length	0.12 mm
shoulder	0.10 mm
waist	0.06 mm
hip	0.07 mm
ext.	0.05 mm

Translator

length	0.11 mm
widest	0.03 mm

Caudicle

bulb diam.	0.04mm
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**Translator/caudicle
type:** d/o.

Pollinia end type: R

Caudicle bulb: G

Retinacula character: HU

Hoya faoensis Kloppenburg & Siar 2008 Type clone



Retinaculum enlarged about 165x. Translator arm is attached to the right side and appear to enter the retinaculum well down on the side near the well rounded hip area, Extensions are very short.

Pollinarium enlarged about 165x. Pollinia are a little shriveled. The shoulder wings extend back from a rounded head, also the same for the waist area. Caudicles are difficult to discern.

Pollinium

length	0.41 mm
widest	0.20 mm

Retinaculum

length	0.11 mm
shoulders	0.14 mm
waist	0.06 mm
hip	0.12 mm
extensions	0.03 mm

Translators

length	0.10 mm
depth	0.02 mm

Caudicle bulb diameter 0.05 mm



Translator/caudicle type: d/o

Pollinia end type: T

Caudicle bulb: G

Retinacula character: S

Hoya sp. CAHUP 5967

Labeled *Hoya incrassata*. Most likely correct pollinium a little shorter.



Immage of the pollinarium above is enlarged about 165x

Pollinium

length	0.41 mm
Widest	0.15 mm

Retinaculum

length	0.17 mm to crotch
shoulders	0.08 mm not easy to differentiate
narrowest	0.03 mm
extensions	0.04 mm

Translators

length	0.11 mm
depth	0.04 mm fiddle shaped, broad

Caudicle

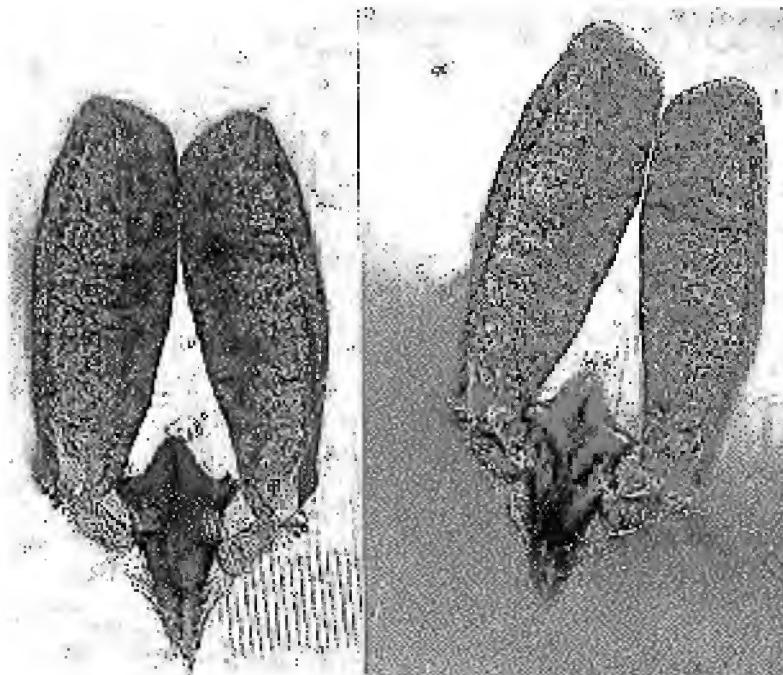
bulb diam. 0.05 mm difficult to differentiate, best on left side.

Translator/caudicle type: d/o

Pollinia end type: RT

Hoya retusa Dalzell 1852

Flowers from Eva-Karin Wiberg, Sweden 5/28/97



right picture.

Two pictures of the pollinaria the left one showing the retinaculum from the front view Showing the translator arms entering at about the waist area and the one on the right the back side of the retinaculum Here you can see through the thin walled entry cavities into where the translators and the caudicles enter and are attached above. The retinacular shoulder is curved upward at the outer ends the waist is narrow hips plainly visible in the

Pollinia

length	0.41 mm
widest	0.14 mm

Retinaculum

length	0.24 mm long including extensions
shoulders	0.14 mm
waist	0.09 mm
extensions ca.	0.07 mm.

Translators

length	0.08 mm long (outside retinacula);
depth	0.03 mm
wide	0.01 mm

Caudicles

bulb diam. 0.06 mm, slightly stippled.

Translator/caudicle type: d/o

Pollinia end type: R?

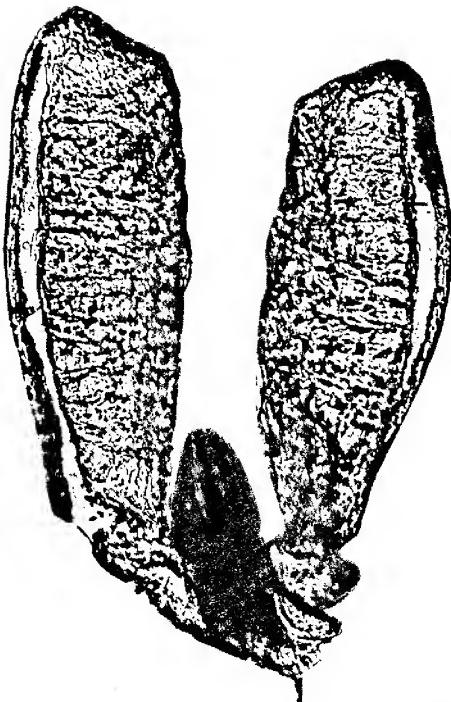
Caudicle bulb: G

Retinacula character: S or HU

Hoya sp. PNH 4854

Gaerlan, Sagcal & Fernando 10/10/91

Dinagat, Mindanao, Philippines.



Magnified approximately 165x.

Pollinium

length:	0.41 mm
widest:	0.16 mm

Retinaculum

length:	0.18 mm
shoulder:	0.08 mm
waist:	0.05 mm
hip:	0.06 mm
ext.:	0.04 mm

Translators

length:	0.10 mm
depth:	0.02 mm

Caudicle

bulb. diam.: 0.08 mm

Translator/caudicle type: d/o

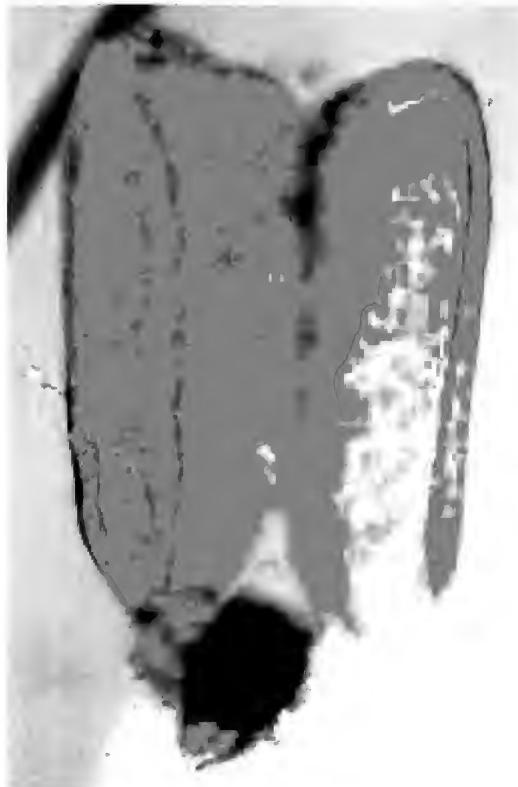
Pollinia inner end type: F

Caudicle bulb: G

Retinacula character: HE

Hoya sp. W 8508

W 8508 Hoya pottsii.....not correct as this sp. not in Samoa.



Pollinarium enlarged about 150x.

Pollinia

length	0.40 mm
widest	0.22 mm

Retinaculum

length	0.13 mm
shoulder	0.11 mm
waist	0.09 mm
hip	0.10 mm
ext.	0.05 mm

Translator

length	0.10 mm
depth	0.05 mm

Caudicle

bulb diam.	0.07 mm
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Pollinia inner apex type: RF

Translator/caudicle type: d/o

Caudicle bulb: G

Retinacula character: S

Hoya renuncola Kloppenburg & Mendoza
(unpublished) GM #167



Pollinarium enlarged 110x.

Pollinium

length	0.40 mm
widest	0.20 mm

Retinaculum

length	0.12 mm
shoulder	0.13 mm
waist	0.09 mm
hip	0.10 mm
ext.	0.10 mm

Translator

length	0.10 mm
widest	0.04 mm

Caudicle

bulb 0.05 mm x 0.05 mm

Translator/ caudicle type:
d/o

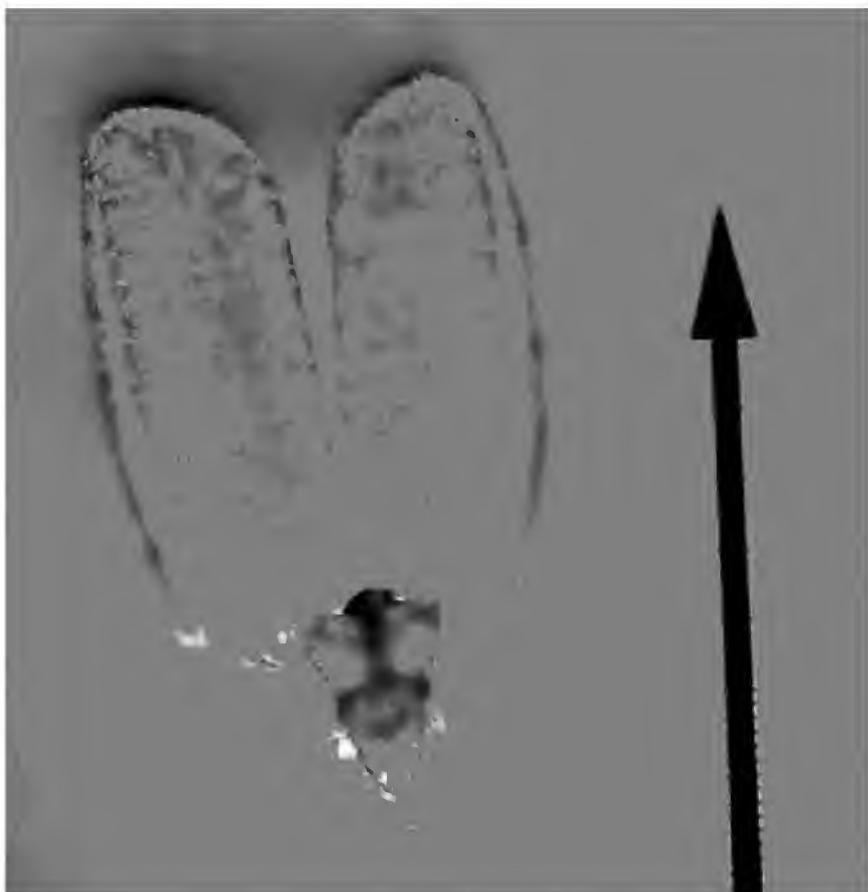
Translators have scaly surfaces and the caudicles are clear.

Pollinia apex type: R

Caudicle bulb: C

Retinacula character: S

Hoya markoi Kloppenburg & Mendoza
(unpublished) GM #61



Pollinarium
enlarged ca. 180x.

Pollinium

length	0.40 mm
widest	0.15 mm

Retinacula

length	0.12 mm
shoulder	0.10 mm
waist	0.06 mm
hip	0.07 mm
ext.	0.03 mm

Translator
length 0.10 mm
widest 0.04 mm

Caudicle
bulb diam. 0.04 mm

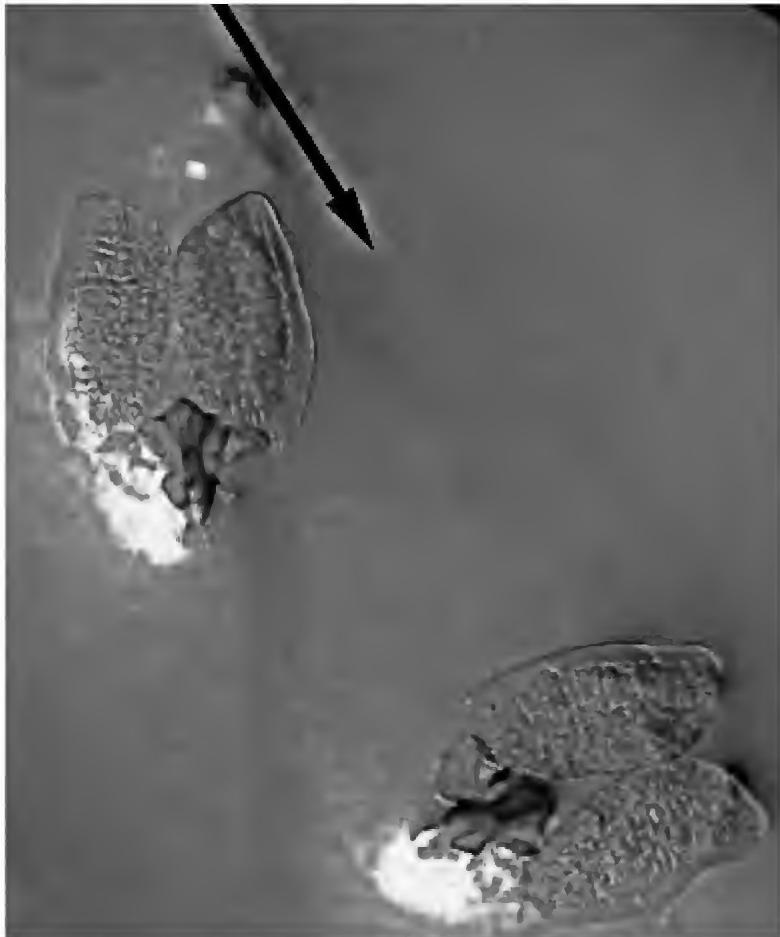
Translator/caudicle type: d/o

Pollinia end type: R

Caudicle bulb: G

Retinacula character: S

***Hoya blashernaiaeii* subsp. *inawaensis* Kloppenburg & Mendoza
(unpublished) GM #118**



Pollinaria enlarged ca.
80x.

Pollinaria

length	0.40 mm
widest	0.21 mm

Retinaculum

length	0.15 mm
shoulder	0.15 mm
waist	0.08 mm
hip	0.10 mm
ext	0.05 mm

Translator

length	0.12 mm
wide	0.06 mm

Caudicle

bulb diam.	0.05 mm
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Translator/caudicle type:
d/o

Pollinia apex type: RT

Caudicle bulb: C

Retinacula character: S

***Hoya blashernaezii* subsp. *infantaensis* Kloppenburg & Mendoza
(unpublished) GM #8**



Pollinaria enlarged ca.
160x.

Pollinium

length	0.40 mm
widest	0.21 mm

Retinaculum

length	0.18 mm
shoulder	0.18 mm
waist	0.08 mm
hip	0.09 mm
ext.	0.06 mm

Translator

length	0.12 mm
depth	0.05 mm

Caudicle

bulb diam.	0.05 mm
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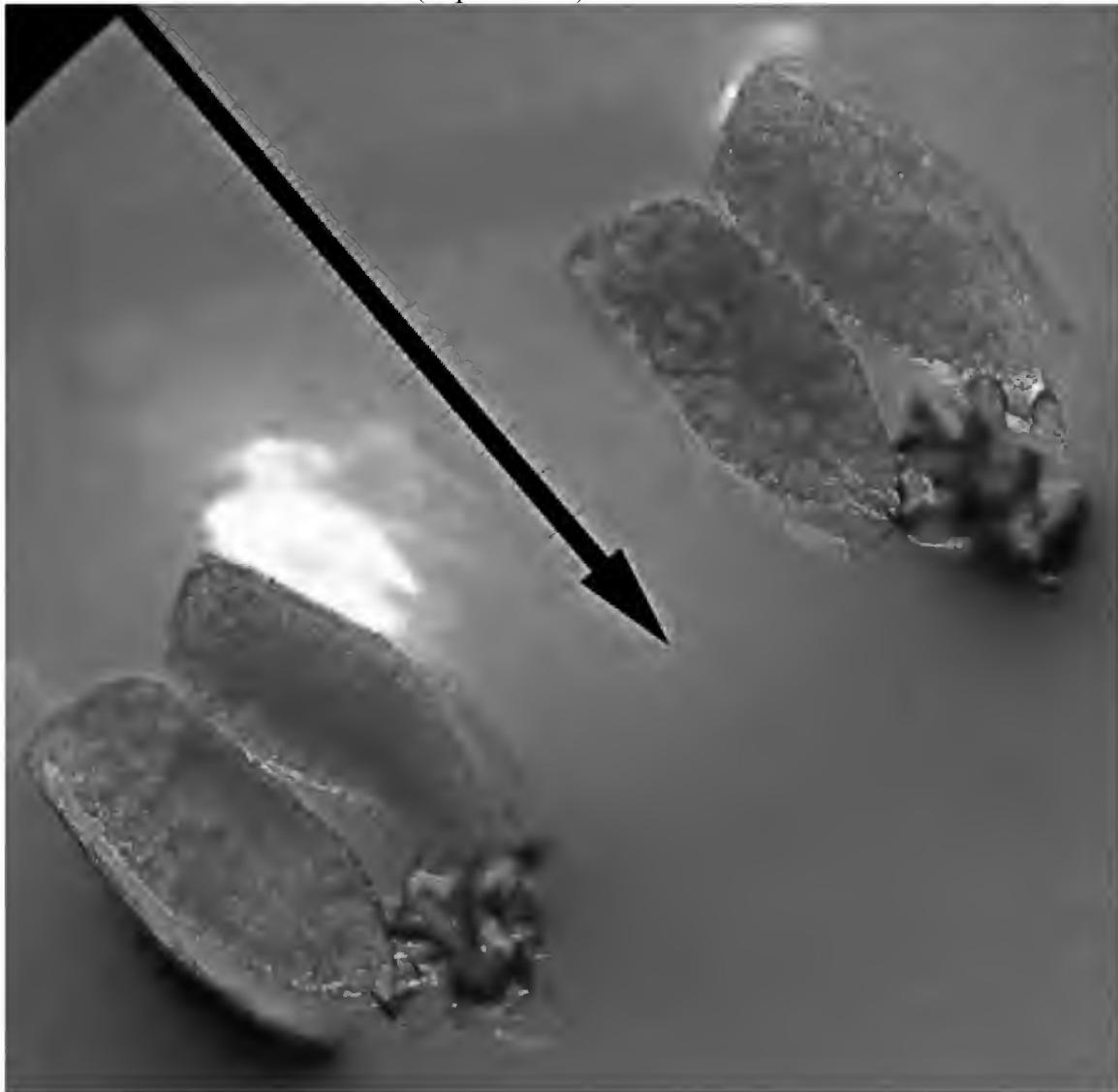
Translator/caudicle type:
d/o

Pollinia apex type: T

Caudicle bulb: G ?

Retinacula character: S

***Hoya blashernaezii* subsp. *lagyoensis* Kloppenburg & Mendoza
(unpublished) GM #123**



Two pollinarium enlarged ca. 140x.

Pollinium

length	0.40 mm
widest	0.17 mm

Caudicle

bulb diam. 0.05 mm

Retinaculum

length	0.15 mm
shoulder	0.13 mm
waist	0.08 mm
hip	0.10 mm
ext.	0.03 mm

Translator/caudicle type: d/o

Pollinia apex type: RT

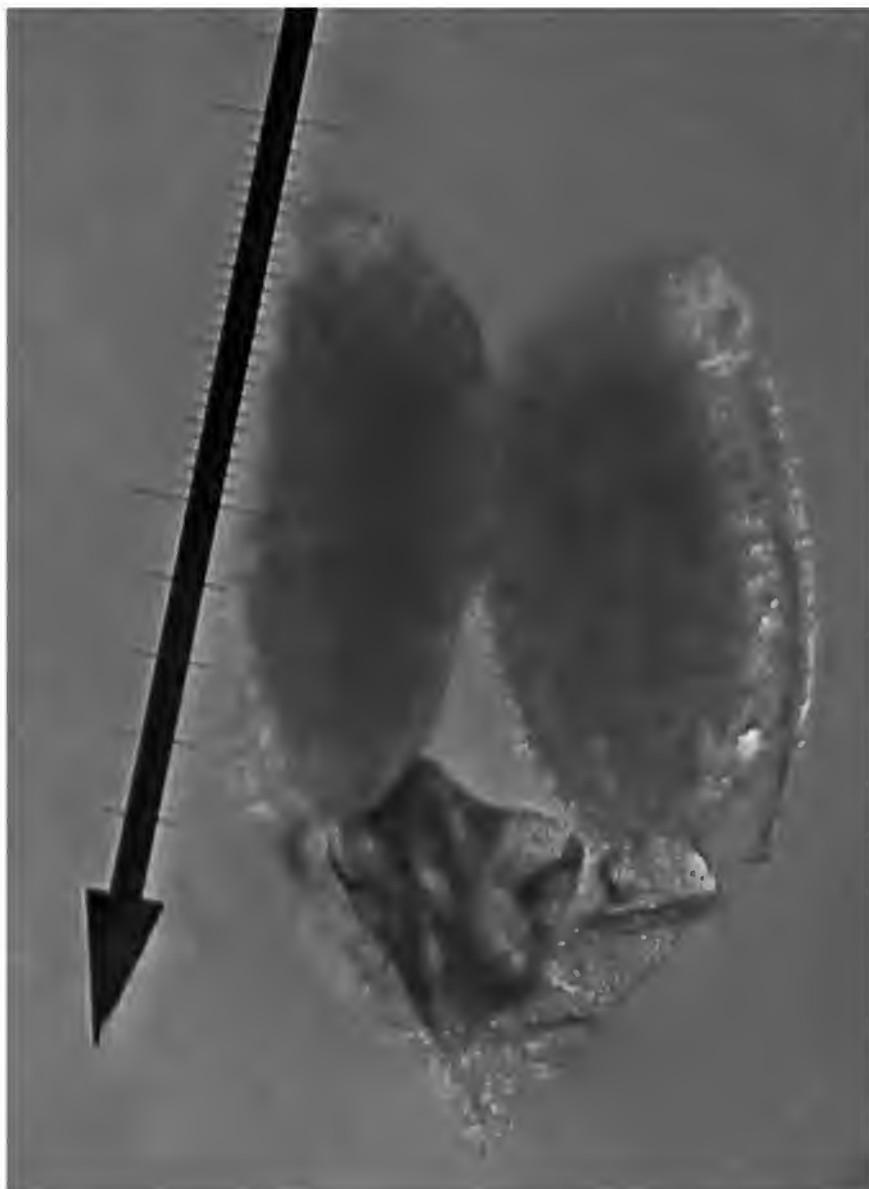
Caudicle bulb: C

Translator

length	0.07 mm
depth	0.03 mm

Retinacula character: S

***Hoya blashernaezii* subsp. *straminea* Kloppenburg & Mendoza**
(unpublished) GM #21



Pollinarium enlarged
ca. 210x

Pollinium

length 0.40 mm
widest 0.21 mm

Retinaculum

length 0.17 mm
shoulder 0.18 mm
waist 0.12 mm
hip 0.14 mm
ext. 0.06 mm

Translator

length 0.14 mm
depth 0.07 mm

Caudicle

diam. 0.07 mm

Translator/caudicle

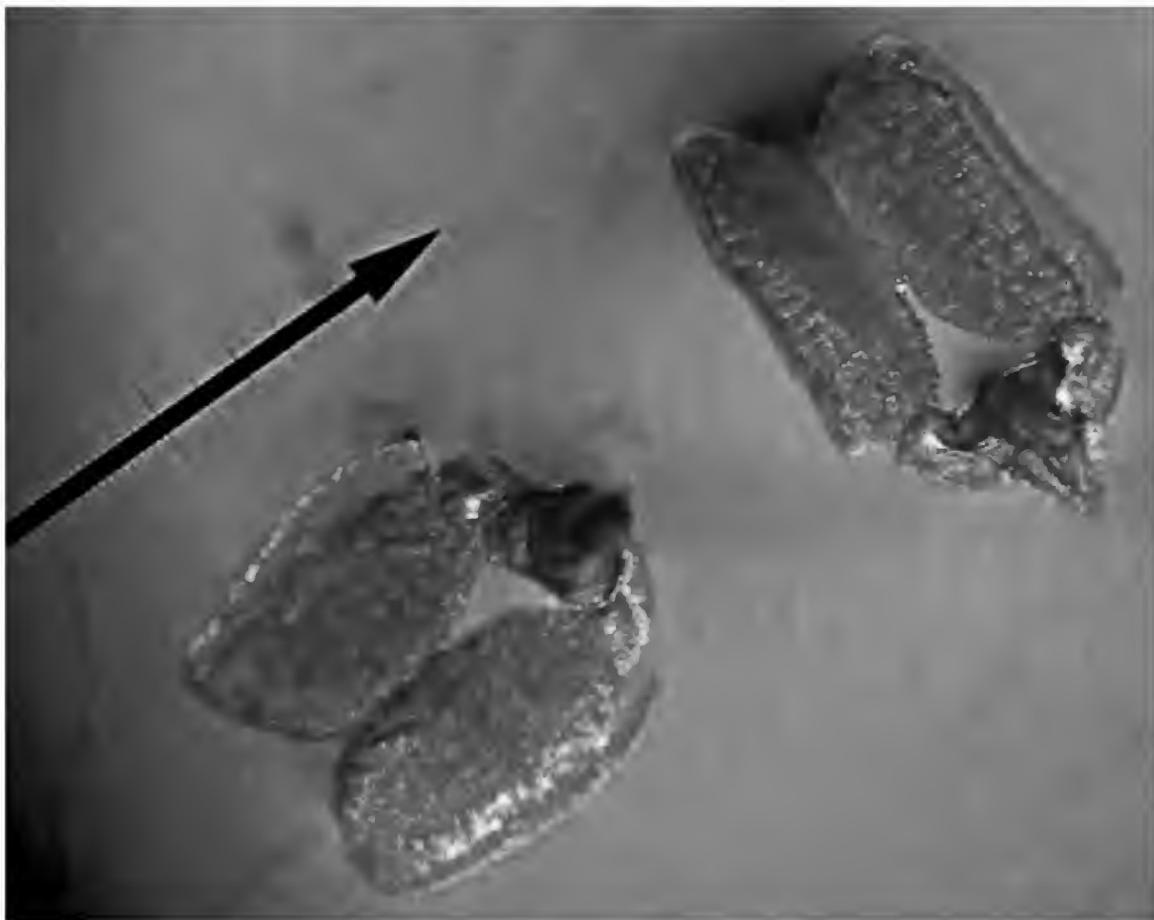
Type: d/o

Pollinia inner end
type: T

Caudicle bulb: G

Retinacula character: S

***Hoya blashernaiaeii* subsp. *tangerina* Kloppenburg & Mendoza**
(unpublished) GM #62



Pollinium enlarged ca. 130x

Pollinium

length	0.40 mm
widest	0.21 mm

Translator

length	0.15 mm
depth	0.04 mm

Retinaculum

length	0.11 mm
shoulder	0.15 mm
waist	0.07 mm
hip	0.10 mm
ext	0.04 mm

Caudicle

bulb diam.	0.07 mm
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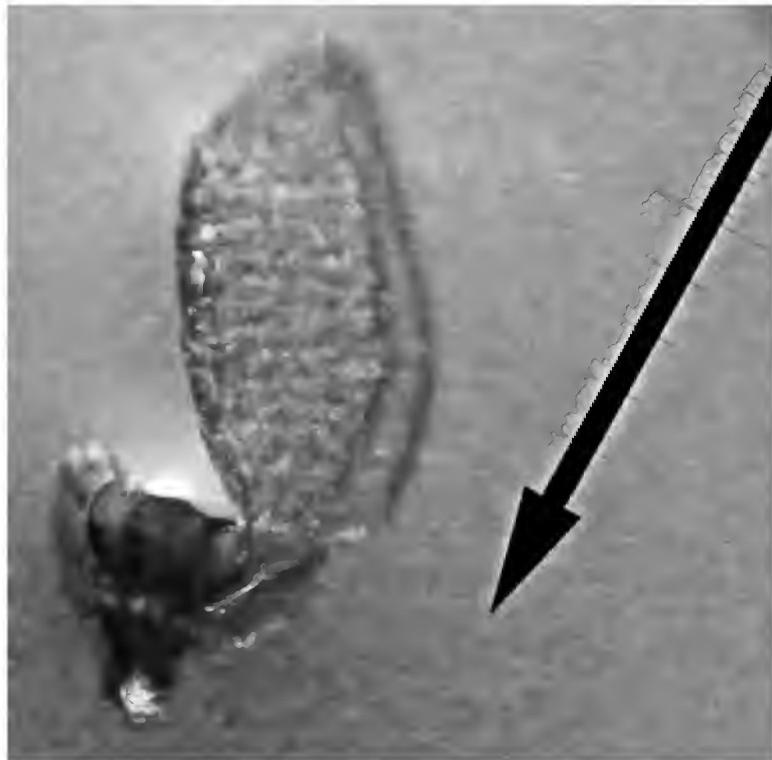
Translator/caudicle type: d/o most likely

Pollinia end type: RT

Caudicle bulb: C

Retinacula character: HU

***Hoya blashernaezii* subsp. *truncata* Kloppenburg & Mendoza**
(unpublished) GM #132



Pollinaria enlarged ca.
170x.

Pollinium

length	0.40 mm
widest	0.20 mm

Retinaculum

length	0.13 mm
shoulder	0.14 mm
waist	0.08 mm
hip	0.10 mm
ext.	0.03 mm

Translator

length	0.13 mm
widest	0.04 mm

Caudicle

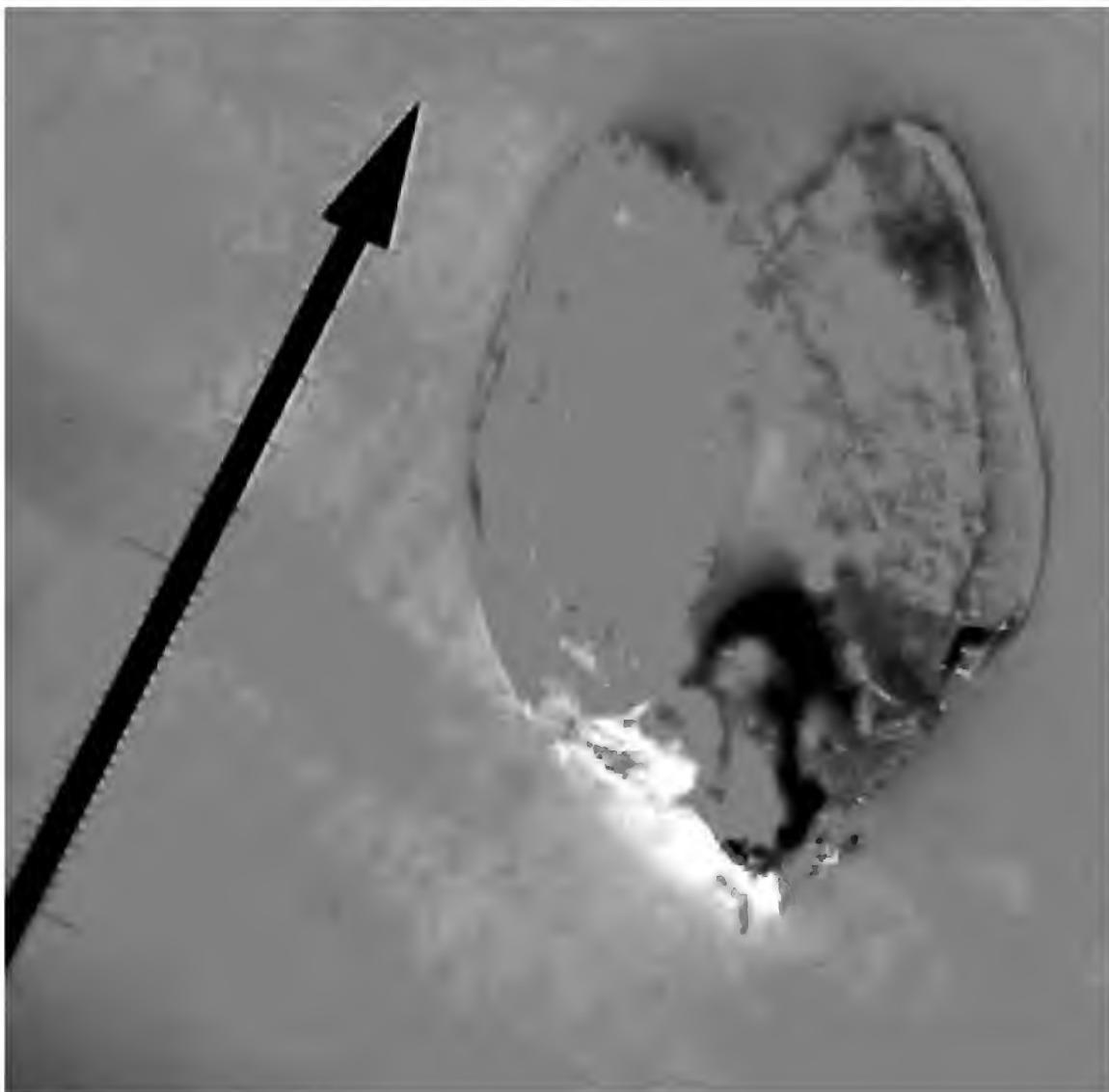
bulb diam.	0.05 mm
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Translator/caudicle type: d/o

Pollinia apex type: T

Caudicle bulb: C ?

Retinacula character: S



Pollinarium enlarged 190x.

Pollinium

length	0.40 mm
widest	0.20 mm

Retinaculum

length	0.18 mm
shoulder	0.15 mm
waist	0.07 mm
hip	0.10 mm
ext	0.04 mm

Translator

length	0.12 mm
widest	0.05 mm

Caudicle

bulb diam.	0.06 mm
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Translator/caudicle type: d/o

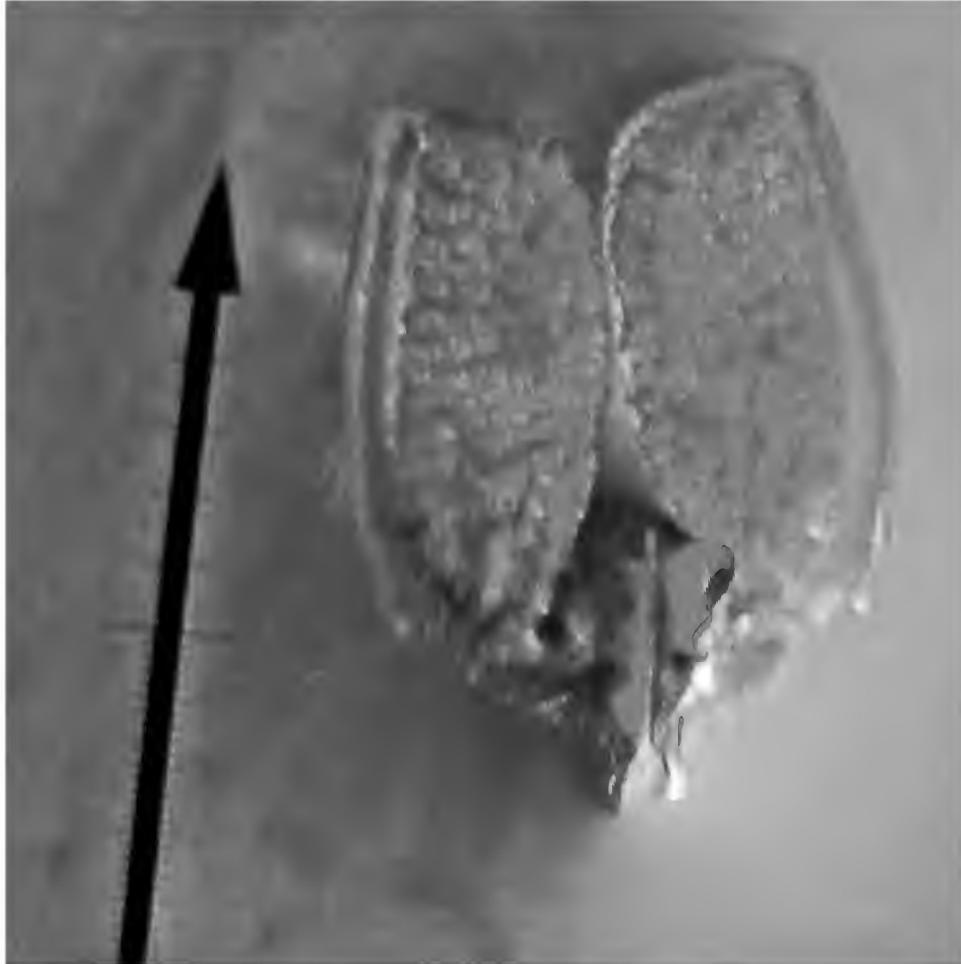
Pollinia apex type: T

Caudicle type: G

Retinacula type: S

Hoya blashernaiaeii subsp. *lalawinanensis* Kloppenburg & Mendoza

(unpublished) GM #128



Pollinaria enlarged ca. 126x.

Pollinium

length	0.40 mm
widest	0.21 mm

Caudicle

bulb diam.	0.06 mm
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Retinaculum

length	0.18 mm
shoulder	0.12 mm
waist	0.08 mm
hip	0.09 mm
ext.	0.05 mm

Translator/caudicle type: d/o

Pollinia apex type: RT

Caudicle bulb: C

Translator

length	0.11 mm
widest	0.05 mm

Retinacula character: S

Hoya querinoensis Kloppenburg & Siar 2007

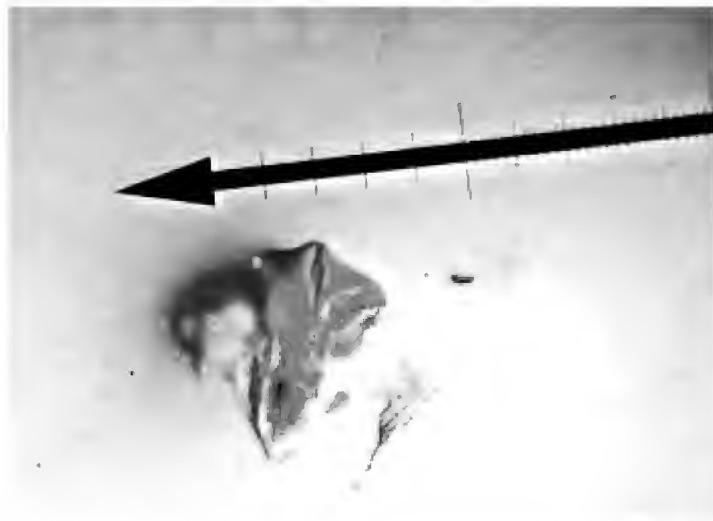
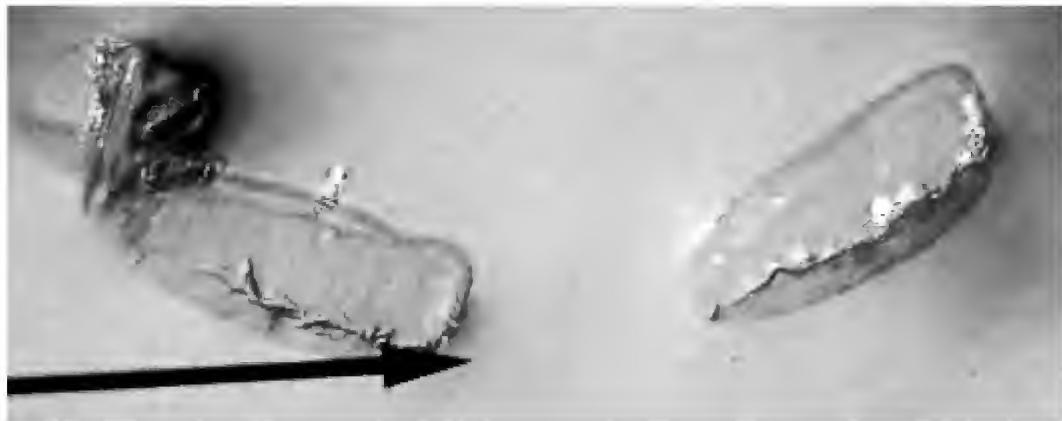


Photo with Epson digital camera of the retinaculum. Arrow is measurement scale. Head is 0.1 mm long.

Retinaculum:

length	0.20 mm.
shoulder	0.15 mm.
waist	0.06 mm.
hip	0.10 mm.
ext.	0.02 mm.



Pollinium:

length	0.40 mm.
widest	0.19 mm.

Translators:

length	0.14 mm.
depth ca.	0.03 mm.

Translator/ caudicle type: d/o

Ratio: ret/pol 1.8

poll width/length 2.14

Pollinia inner end Type: RT

Retinacula: S

***Hoya blashernaezii* subsp. *nuevavizcayensis* Kloppenburg & Mendoza
(unpublished) GM #145**



Pollinaria enlarged ca.
140x.

Pollinium

length	0.39 mm
widest	0.20 mm

Retinaculum

length	0.13 mm
shoulder	0.12 mm
waist	0.10 mm
hip	0.12 mm
ext.	0.02 mm

Translator

length	0.10 mm
wide	0.03 mm

Caudicle

bulb diam. 0.06 mm

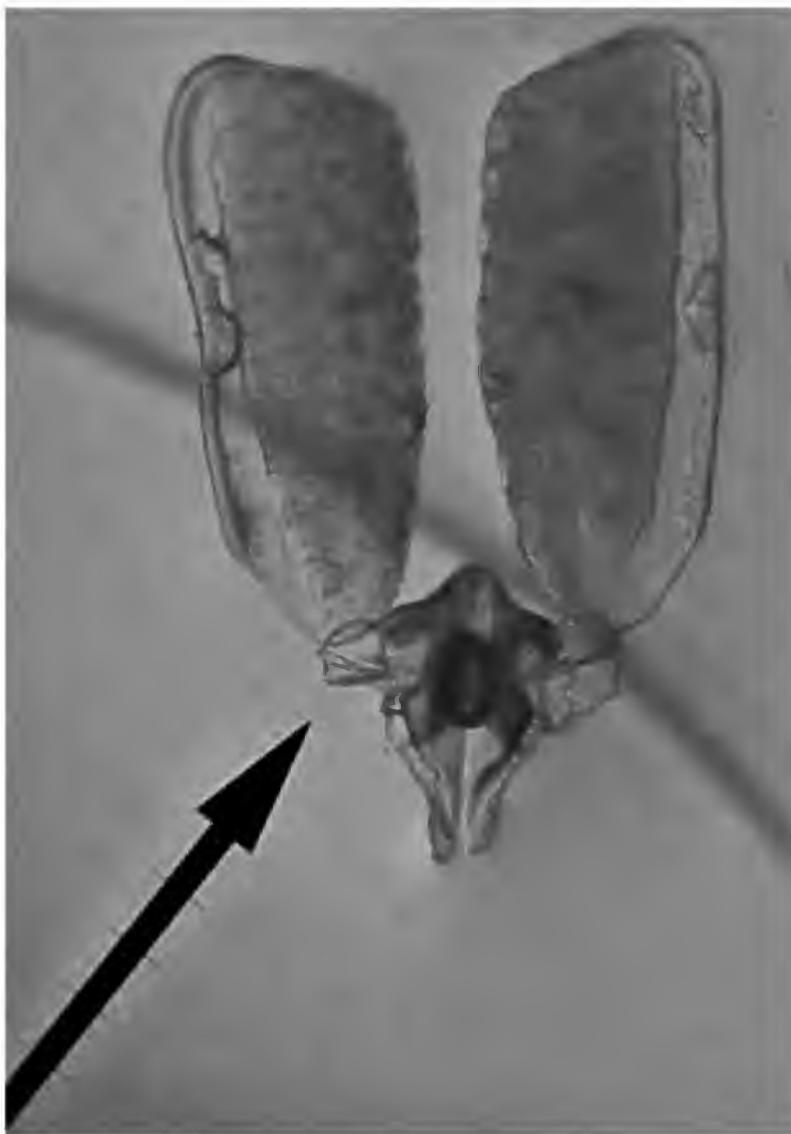
Translator/caudicle type:
d/o

Pollinia apex type: R

Caudicle bulb: G

Retinacula character: S

Hoya lagyaensis Kloppenburg & Mendoza
(unpublished) GM #170



Pollinaria enlarged
180x.

Pollinium

length	0.39 mm
widest	0.17 mm

Retinaculum

length	0.10 mm
shoulder	0.13 mm
waist	0.06 mm
hip	0.10 mm
ext.	0.06 mm

Translator

length	0.06 mm
widest	0.03 mm

Caudicle

bulb diam.	0.04 mm
------------	---------

Translator/caudicle type: d/o

Caudicle bulb is clear.
Pollen grains not well defined. Translators
rectangular.

Pollinia apex type: T

Retinacula type: S

Caudicle bulb: C

Hoya afuangae Kloppenburg & Cajano
(unpublished)



Pollinarium enlarged 200x

Pollinium

length	0.39 mm
widest	0.17 mm

Retinaculum

length	0.11 mm
shoulder	0.10 mm
hip	0.07 mm
waist	0.08 mm
ext.	0.08 mm
overall length	0.19 mm

Translator

length	0.05 mm
widest	0.03 mm

Translator/caudicle type:
d/o

Caudicle:

bulb diam. 0.06 x 0.04
mm

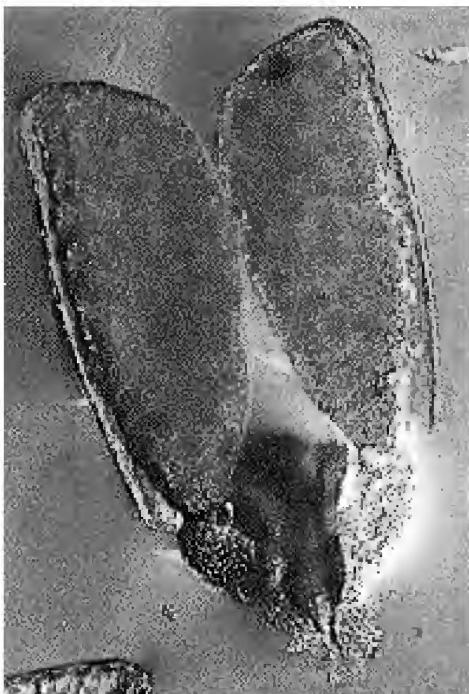
Caudicle: opaque

Pollinia ends: T

Retinacula type: S

Caudicle: C

Hoya polystachya Blume 1849



Pollinaria enlarged about 165x. It is not a large pollinaria. The pollinia are broad with rounded inner apices a well defined pellucid edge. The most striking thing here is the well defined and differentiated translators. supporting a small caudicle at least small at the bulbous apex.. Undifferentiated covers the retinaculum outer apical area.

Pollinium

length	0.39 mm
width	0.16 mm

Retinaculum

length	0.15 mm
shoulders	0.12 mm
waist	0.04 mm
hip	0.05 mm
ext.	0.05 mm

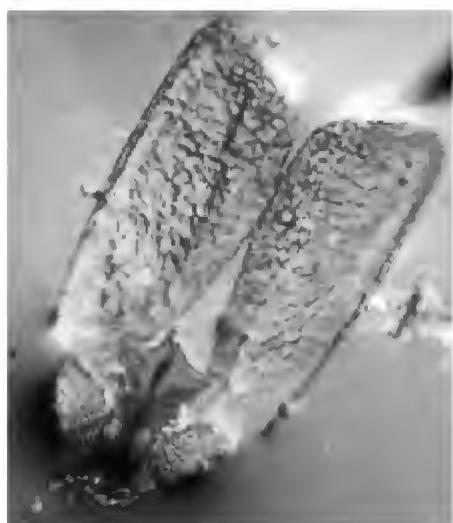
Translators

length	0.09 mm
depth	0.06 mm

Caudicle

bulb diam.	0.07 mm
granulate	

Another photo of the pollinium showing the retinacula in more detail



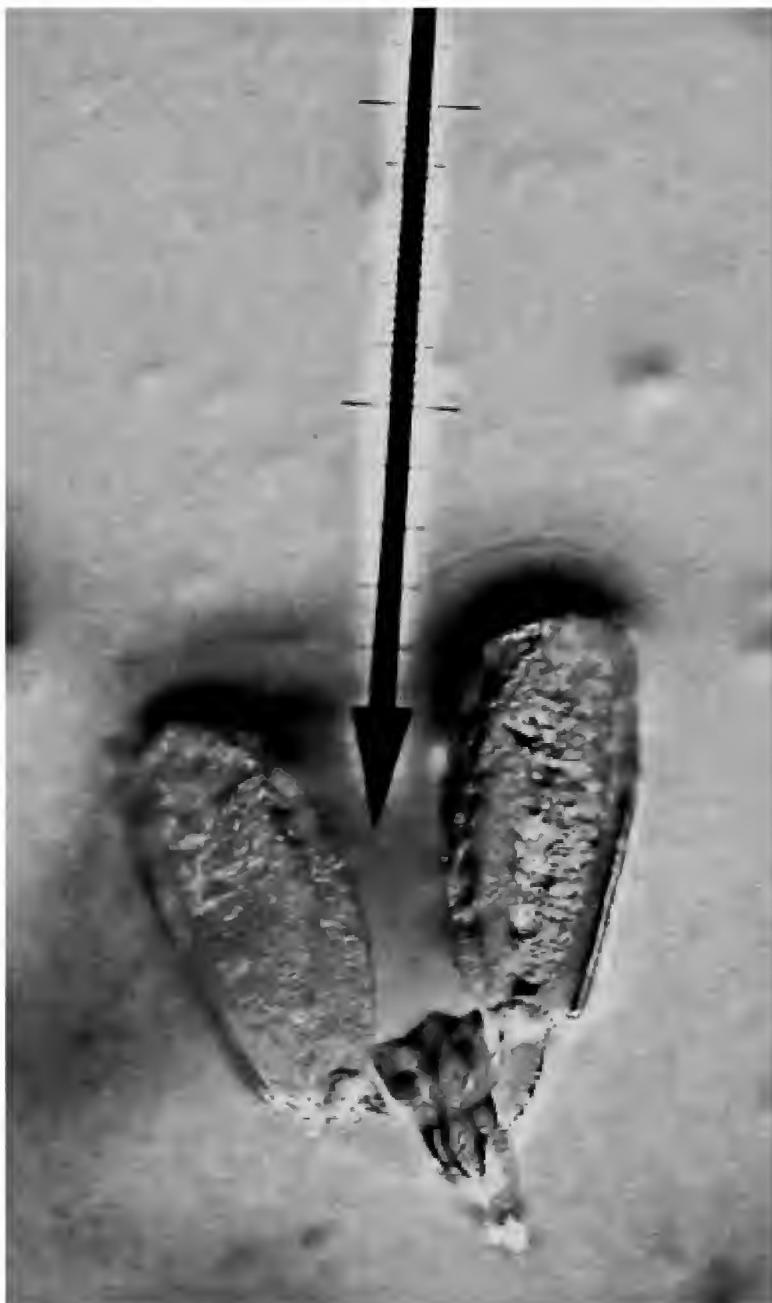
Translator/caudicle type: d/o

Pollinia inner end type: RT

Caudicle bulb: G

Retinacula character: S

***Hoya moninae* Kloppenburg & Cajano 2014**



Pollinaria enlarged about 165x.

Pollinium

length 0.39 mm.
widest 0.17 mm.

Retinaculum

length 0.11mm.
shoulder 0.09 mm.
waist 0.03 mm.
hip 0.07 mm.
ext. 0.02 mm.

Translators

length 0.09 mm.
depth 0.04 mm.

Caudicle

bulb diam. 0.05 mm.

Caudicle bulb is relatively small.

Ratio: r/p 3
pl/pw 2.3

Translator/caudicle type:
d/o

Pollinia apex type: R

Caudicle bulb: ?

Retinacula character: S

Hoya mamagongensis Kloppenburg & Mendoza
(unpublished) GM #153



Pollinaria enlarged 140x.

Pollinium

length	0.39 mm
widest	0.18 mm

Retinaculum

length	0.16 mm
shoulder	0.13 mm
waist	0.06 mm
hip	0.09 mm
ext.	0.05 mm

Translator

length	0.15 mm
wide	0.04 mm

Caudicle

bulb diam.	0.06 mm
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Translator caudicle type: d/o

Pollinia apex type: T

Caudicle bulb: ?

Retinacula character: S

Hoya ferrerasii Kloppenburg & Siar 2010



Pollinia apex type: T

Retinacula character: LS

Translators delta shaped.

Enlarged about
119x.

Pollinium:
length 0.39 mm
widest 0.18 mm

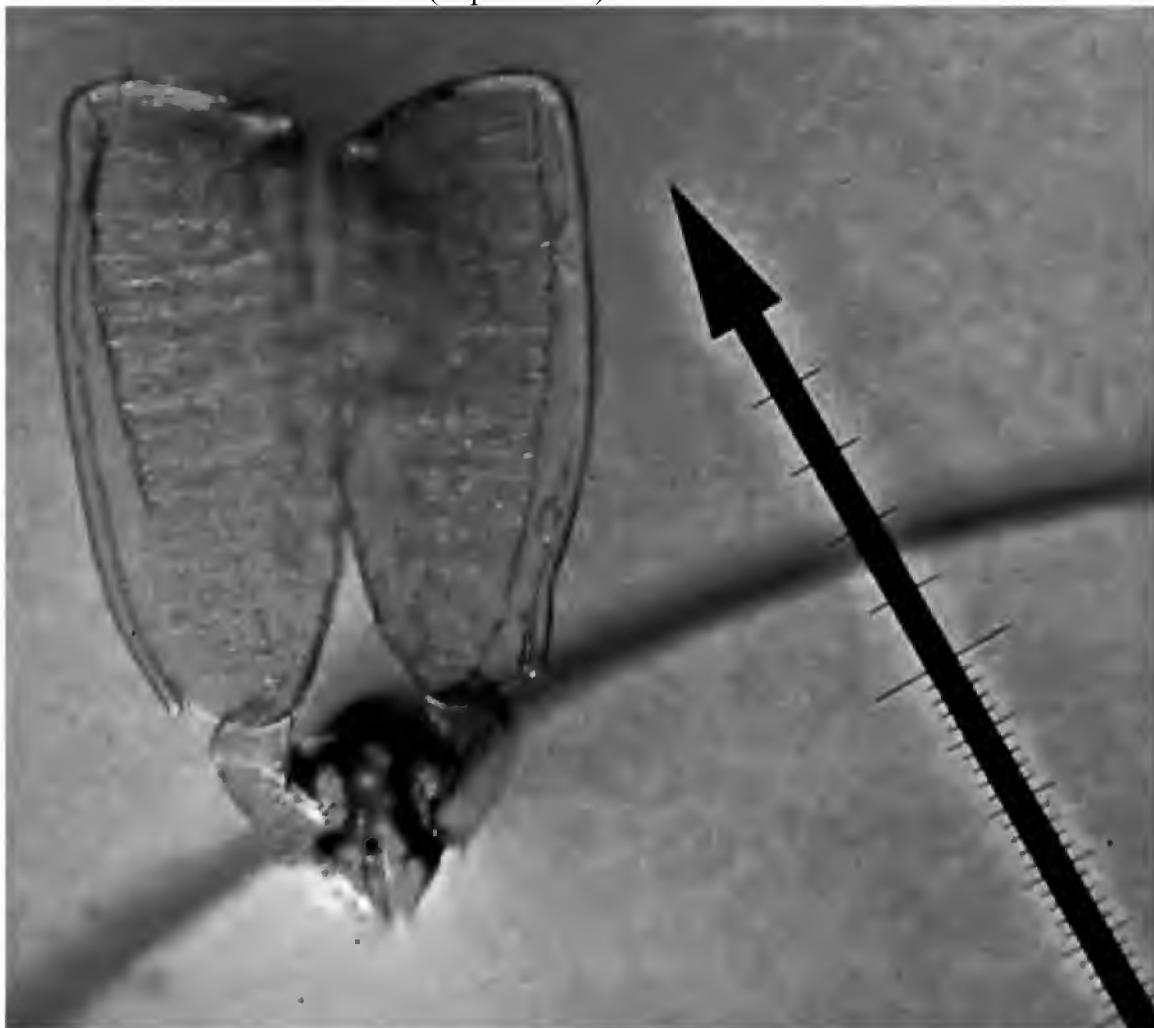
Retinaculum:
length 0.18 mm
shoulder 0.10 mm
waist 0.06 mm
hip 0.08 mm
ext. 0.02 mm

Translator:
length 0.10 mm
depth 0.08 mm

Caudicle:
bulb diam. 0.05 mm
Type: C

**Translator
caudicle type:** d/o

Hoya tagumpayensis Kloppenburg & Mendoza
(unpublished) GM #154



Pollinaria enlarged 200x.

Pollinium

length	0.39 mm
widest	0.17 mm

Translator

length	0.09 mm
widest	0.05 mm

Retinaculum

length	0.09 mm from head to crotch
shoulder	0.12 mm
waist	0.05 mm
hip	0.11 mm
ext.	0.05 mm

Retinacula character: S

Translator/caudicle type: d/o

Pollinia apex type: F

Caudicle bulb: C

Caudicle

bulb diam	0.05 mm
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***Hoya blashernaezii* subsp. *siariae* Kloppenburg 2014**



Pollinarium enlarged, the arrow in the lower right is 1 mm long and with a base of 1/2 mm. The pellucid edge runs from the outer apex all the way down the outside. The Pollinia are broad and short, translators are short and caudicles small. The retinaculum is relatively large, with broad shoulders and waist areas.

Pollinia

length	0.39 mm
widest	0.29 mm

Retinaculum

length	0.15 mm
shoulder	0.14 mm
waist	0.06 mm
hips	0.10 mm
extensions	0.03 mm

Translators

length	0.15 mm
depth	0.04 mm

Caudicle bulb.

diameter	0.06 mm
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Type: G

Translator/caudicle type: d/o

Pollinia apex type: T

Retinacula character: S

Hoya kamgongensis Kloppenburg & Mendoza
(unpublished) GM #136



Pollinarium
enlarged ca. 130x.

Pollinium

length	0.39 mm
widest	0.19 mm

Retinaculum

length	0.15 mm
shoulder	0.12 mm
waist	0.06 mm
hip	0.08 mm
ext.	0.03 mm

Translator

length	0.08 mm
wide	0.05 mm

Caudicle

bulb diam.	0.05 mm
------------	---------

Translator/caudicle type:
d/o

Pollinia inner apex type:
R

Caudicle bulb: C

Retinacula character: S

Note here the extremely fine pollen in the pollinia also that the pellucid edges

to not extend a long way toward the outer end of the pollinium toward the retinacular area.

Hoya blashernaiaeii* subsp. *vadacorolla Kloppenburg & Mendoza
(unpublished) GM #137



Pollinaria enlarged ca.
170x.

Pollinium

length	0.38 mm
widest	0.20 mm

Retinaculum

length	0.16 mm
shoulder	0.14 mm
waist	0.07 mm
hip	0.10 mm
ext.	0.02 mm

Translator

length	0.10 mm
widest	0.05 mm

Caudicle

bulb diam.	0.10 mm
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Translator/caudicle type:
d/o

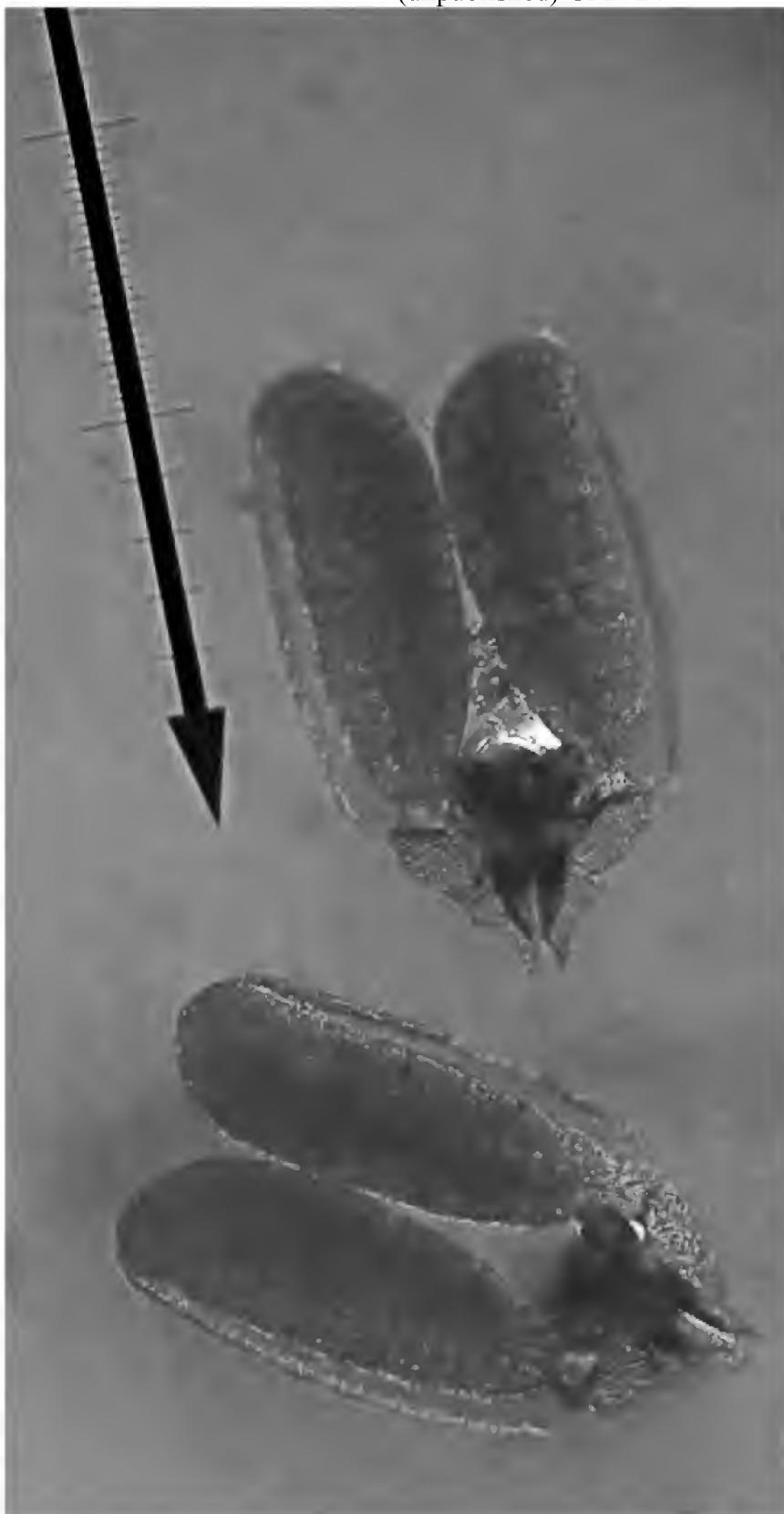
Pollinia inner apex type: R

Caudicle bulb: C

Retinacula character: S

***Hoya eburna* subsp. *infantaensis* Kloppenburg & Mendoza**

(unpublished) GM #24



Pollinarium enlarged
ca. 170x.

Pollinium

length 0.38 mm
widest 0.15 mm

Retinaculum

length 0.12 mm
shoulder 0.12 mm
waist 0.08 mm
hip 0.07 mm
ext. 0.06 mm

Translator

length 0.11 mm
depth 0.04 mm

Caudicle

Bulb diam. 0.05 mm

**Translator/caudicle
type** d/o

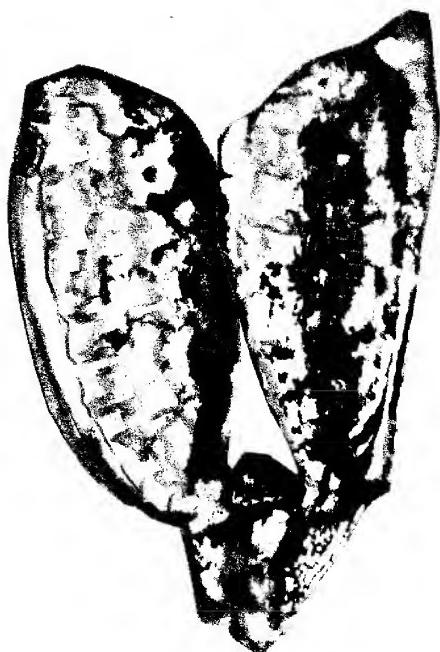
Pollinia end type: R

Caudicle bulb: G

**Retinacula
character:** HU

Hoya sp. CAHUP 5269

M. Wayet 1989 Baguio Village, Diffuin, Qurino, Luzon, Philippines
Fl. white or pale yellow, pubescent recurved corolla.



Magnified approximately 165x.

Pollinium

length:	0.38 mm
widest:	0.15 mm

Retinaculum

length:	0.11 mm
shoulder:	0.07 mm
waist:	0.04 mm
hip:	
ext.:	

Translators

length:	0.08 mm
depth:	0.01 mm

Caudicle

bulb. diam.:	0.04 mm
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Translator/caudicle type d/o

Pollinia end type: RF

Caudicle bulb: ?

Retinacula type: S

***Hoya sulu-anensis* Kloppenburg & Mendoza**
(unpublished) GM #189



Pollinaria enlarged 210x.

Pollinium

length	0.38 mm
widest	0.16 mm

Retinaculum

length	0.17 mm
shoulder	0.09 mm
#2 shoulder	0.09 mm
waist	0.04 mm
hip	0.08 mm
ext.	0.04 mm

Translator

length	0.09 mm
wide	0.04 mm

Caudicle

bulb diam.	0.04 mm
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Translator/caudicle type:

d/o

Pollinia inner apex type:

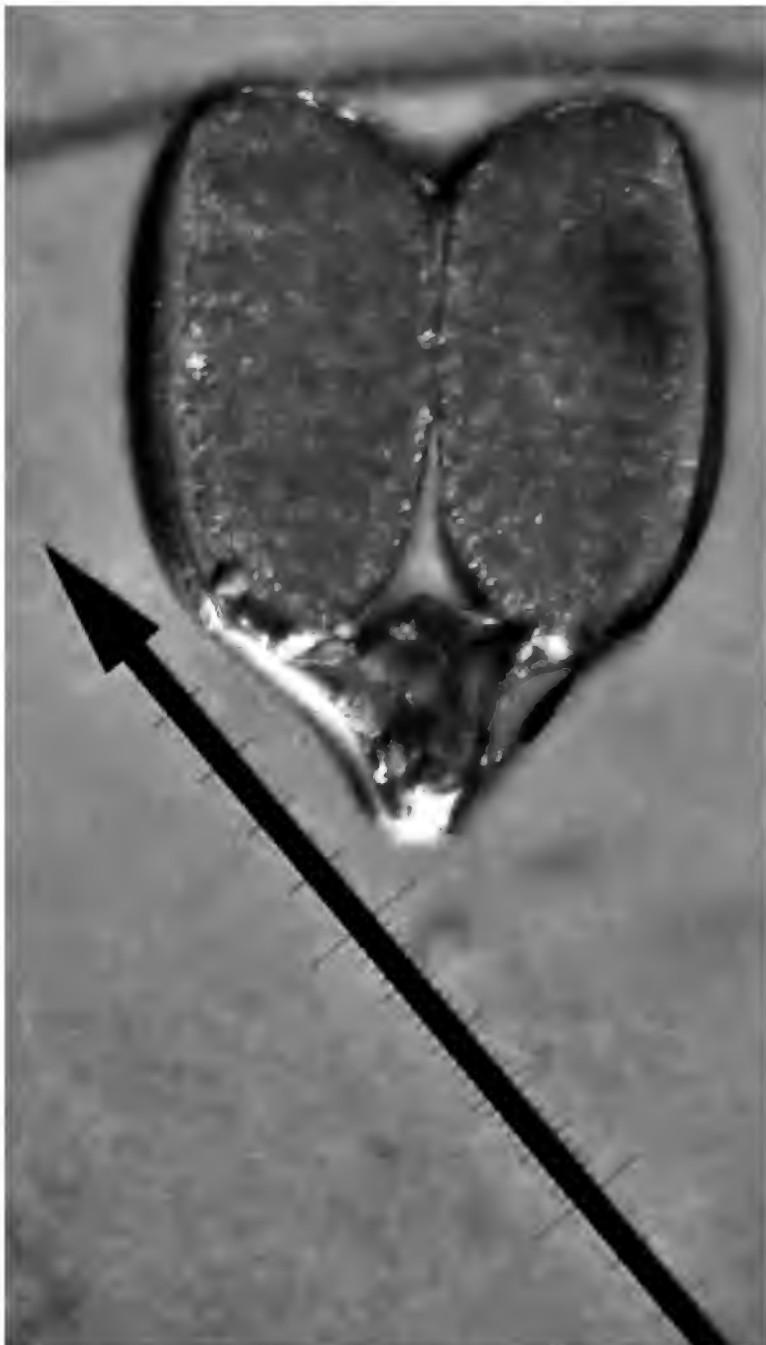
RT

Caudicle bulb: C

Retinacula character: 2S

***Hoya blashernaezii* subsp. *mendozai* Kloppenburg**

(unpublished) GM #147



Pollinarium enlarged
180x.

Pollinium

length	0.37 mm
widest	0.22 mm

Retinaculum

length	0.13 mm
shoulder	0.13 mm
waist	0.06 mm
hip	0.09 mm
ext.	0.03 mm

Translator

length	0.10 mm
depth	0.04 mm

Caudicle

bulb diam.	0.05 mm
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Pollinia inner apex

type: d/o

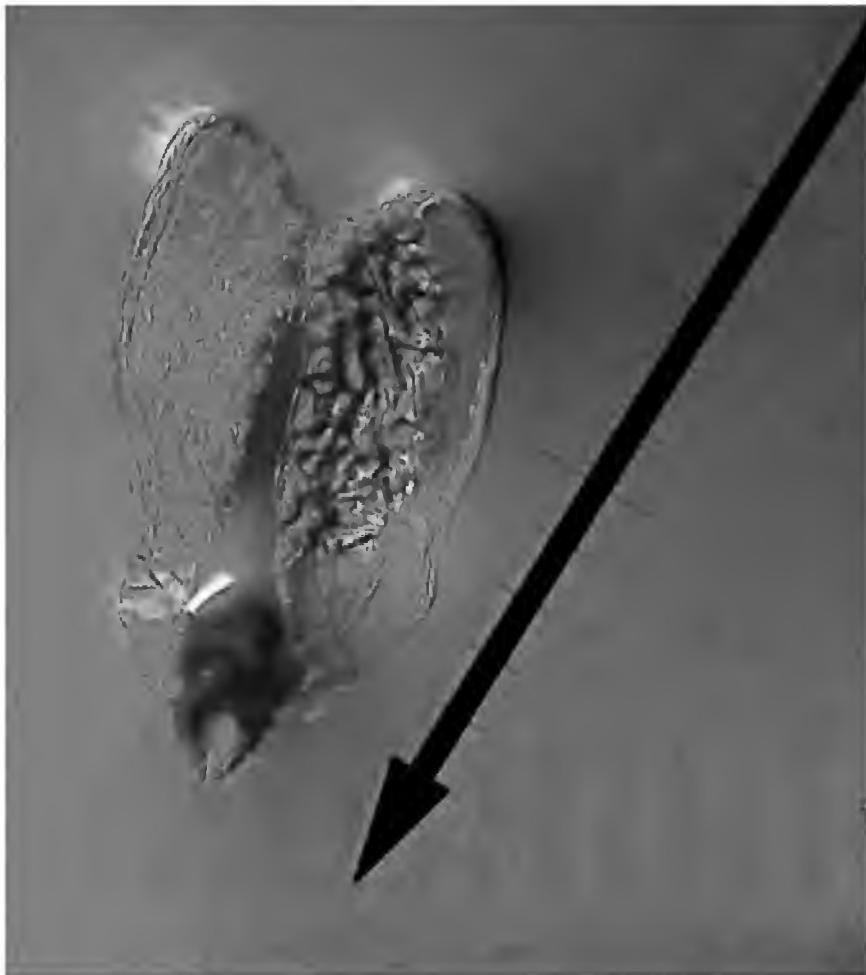
Translator/caudicle

type: R

Caudicle bulb: ?

Retinacula character: S

Hoya lambioae Kloppenburg, Guevarra, Cajano, & Carandang 2015



Pollinarium
enlarged ca. 220x.

Pollinium
length 0.37 mm
widest 0.15 mm

Retinaculum
length 0.10 mm
shoulder 0.10 mm
waist 0.04 mm
hip 0.07 mm
ext. 0.05 mm

Translator
length 0.07 mm
width 0.02 mm

Caudicle
bulb diam. 0.05 mm
Type: C

Translator type:
ls/o or d/o

Pollinia apex type: T

Caudicle bulb: C

Retinacula character: S

***Hoya blashernaiaeii* subsp. *armerina* Kloppenburg & Mendoza**
(unpublished) GM #7



Pollinarium
enlarged ca. 152x

Pollinium
length 0.37 mm
widest 0.19 mm

Retinaculum
length 0.16 mm
shoulder 0.14 mm
waist 0.07 mm
hip 0.09 mm
ext. 0.05 mm

Translator
length 0.10 mm
depth 0.05 mm

Caudicle
bulb diam. 0.04 mm

**Retinacula
character:** S

Translator/caudicle type: d/o

Ratio: p/w 1.9

p/r 2.3

Pollinia apex type: R

Caudicle bulb: G

Retinacula type: S

Hoya sp. IPPS 8860
Umbels via Torill Nyhuus march 2007, data 3/28/07



Pollinaria enlarged
about 65x.

Pollinium

length	0.37 mm
widest	0.13 mm

Translators

length	0.09 mm
widest	0.03 mm
depth	0.01 mm

Retinacula

length	0.10 mm
shoulder	0.09 mm
waist	0.05 mm
hip	0.06 mm
ext.	0.05 mm

Caudicle

bulb diam. 0.04 mm

Retinacula character: S

Translator/caudicle type: d/o

Pollinia apex type: R

Caudicle bulb: G

Hoya tomataensis Green and Kloppenburg 2004



Pollinarium enlarged about 165x. The caudicles with a digital microscope show up as clear yellow globs above the translator arms.



Pollinia

length	0.37 mm
Widest	0.16 mm

Retinaculum

length	0.08 mm
shoulders	0.09 mm
Waist	0.06 mm
Hips	0.08 mm
ext.	0.04 mm

Translators

length	0.05 mm
depth	0.03 mm

Caudicle bulb diam. 0.04 mm

Translator/caudicle type: d/o

Pollinia apex type: R

Caudicle bulb: C

Retinacula character: S

***Hoya blashernaezii* subsp. *kamagongensis* Kloppenburg & Mendoza
(unpublished) GM #163**



Pollinaria enlarged 190x.

Pollinium

length	0.36 mm
widest	0.20 mm

Retinaculum

length	0.13 mm
shoulder	0.13 mm
waist	0.06 mm
hip	0.10 mm
ext.	0.04 mm

Translator

length	0.11 mm
widest	0.04 mm

Caudicle

bulb diam.	0.07 mm
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Translator/caudicle type:
d/o

Pollinia apex type: R

Caudicle bulb: C

The retinacular length is measured from head to the crotch (ext.) and does not include the extension length, overall length would be from head apex to end of extensions or here 0.7 mm.

Retinacula character: S

***Hoya blashernaezii* subsp. *nagcarlanensis* Kloppenburg & Mendoza
(unpublished) GM #86**



Pollinaria enlarged ca.
140x.

Pollinium

length	0.36 mm
widest	0.20 mm

Retinaculum

length	0.10 mm
shoulder	0.14 mm
waist	0.05 mm
hip	0.10 mm
ext.	0.06 mm

Translator

length	0.13 mm
widest	0.04 mm

Caudicle

bulb diam.	0.07 mm
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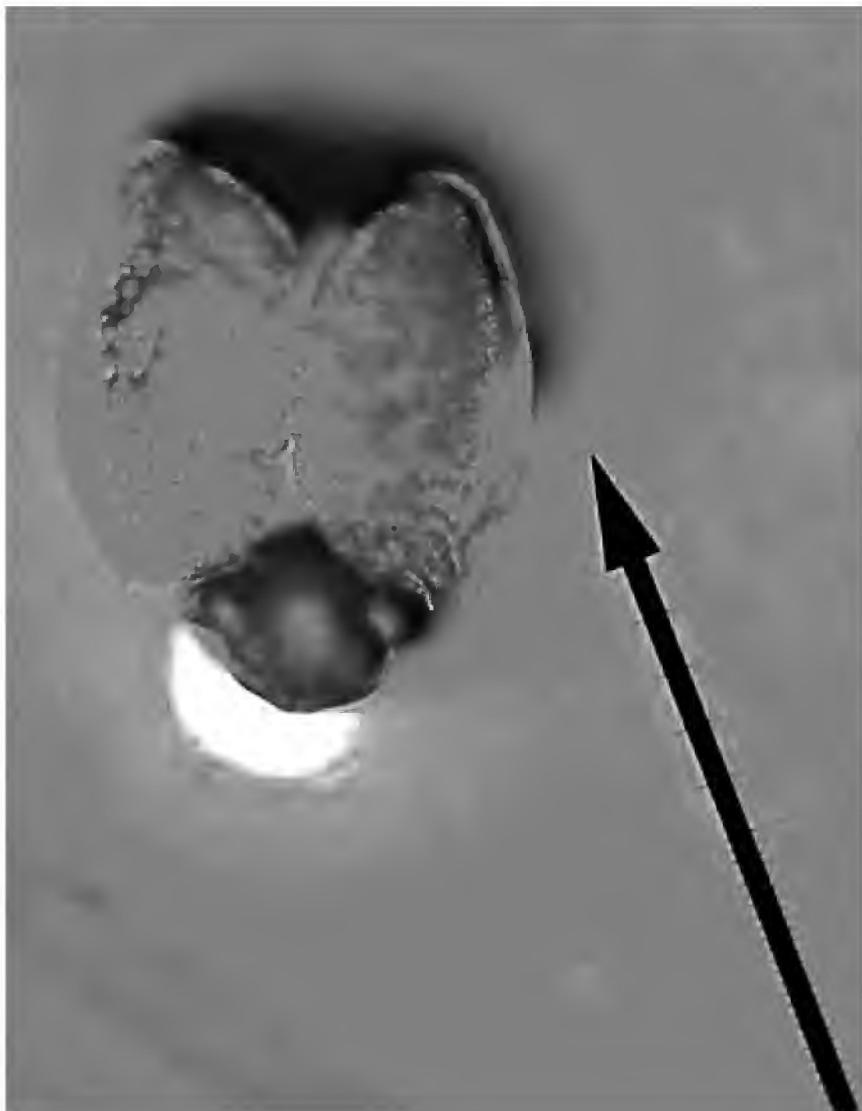
Translator/caudicle type:
d/o

Pollinia end type: T

Caudicle bulb: G

Retinacula character: S

***Hoya blashernaezii* subsp. *parviora* Kloppenburg & Mendoza**



Pollinarium enlarged ca. 140x.

Pollinium

length	0.36 mm
widest	0.21 mm

Translator

length 0.05 mm

Retinaculum

length	0.15 mm
shoulder	0.15 mm
waist	0.11 mm
hip	0.14 mm

Caudicle

bulb diam. 0.06 mm

Translator/caudicle Type: ls/o ?

Pollinia apex type: RT

***Hoya blashernaiae subsp. simeonae* Kloppenburg & Mendoza**
(unpublished) GM #182



Pollinium enlarged 230x

Pollinium

length	0.35 mm
Widest	0.20 mm

Translator

length	0.11 mm
widest	0.04 mm

Retinaculum

length	0.14 mm
shoulder	0.14 mm
waist	0.06 mm
hip	0.10 mm
ext.	0.04 mm

Caudicle

bulb. oval 0.06 x 0.04 mm

Translator/caudicle type: d/o

Pollinia apex type: F

Caudicle bulb: C

Retinacula character: S

Hoya polystachya alba

via Ted Green , Kaaawa Hawaii
Grown and flowered in Hawaii



Pollinarium enlarged about 165x.

Pollinia

length	0.35 mm
widest	0.19 mm

Retinaculum

length	0.18 mm
shoulder	0.11 mm
waist	0.05 mm
hip	0.06 mm
ext.	0.03 mm

Translators

length	0.09 mm
depth	0.04 mm

Caudicle bulb

diameter	0.04 mm
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Translator/caudicle type: d/o

Pollinia apex type: RF

Caudicle bulb: G

Retinacula character: S

Pollinarium enlarged about 165x. Another flowering of same clone



Pollinia

length	0.35 mm
widest	0.19 mm

Retinaculum

length	0.18 mm
shoulder	0.11 mm
waist	0.05 mm
hip.	0.06 mm
ext.	0.04 mm

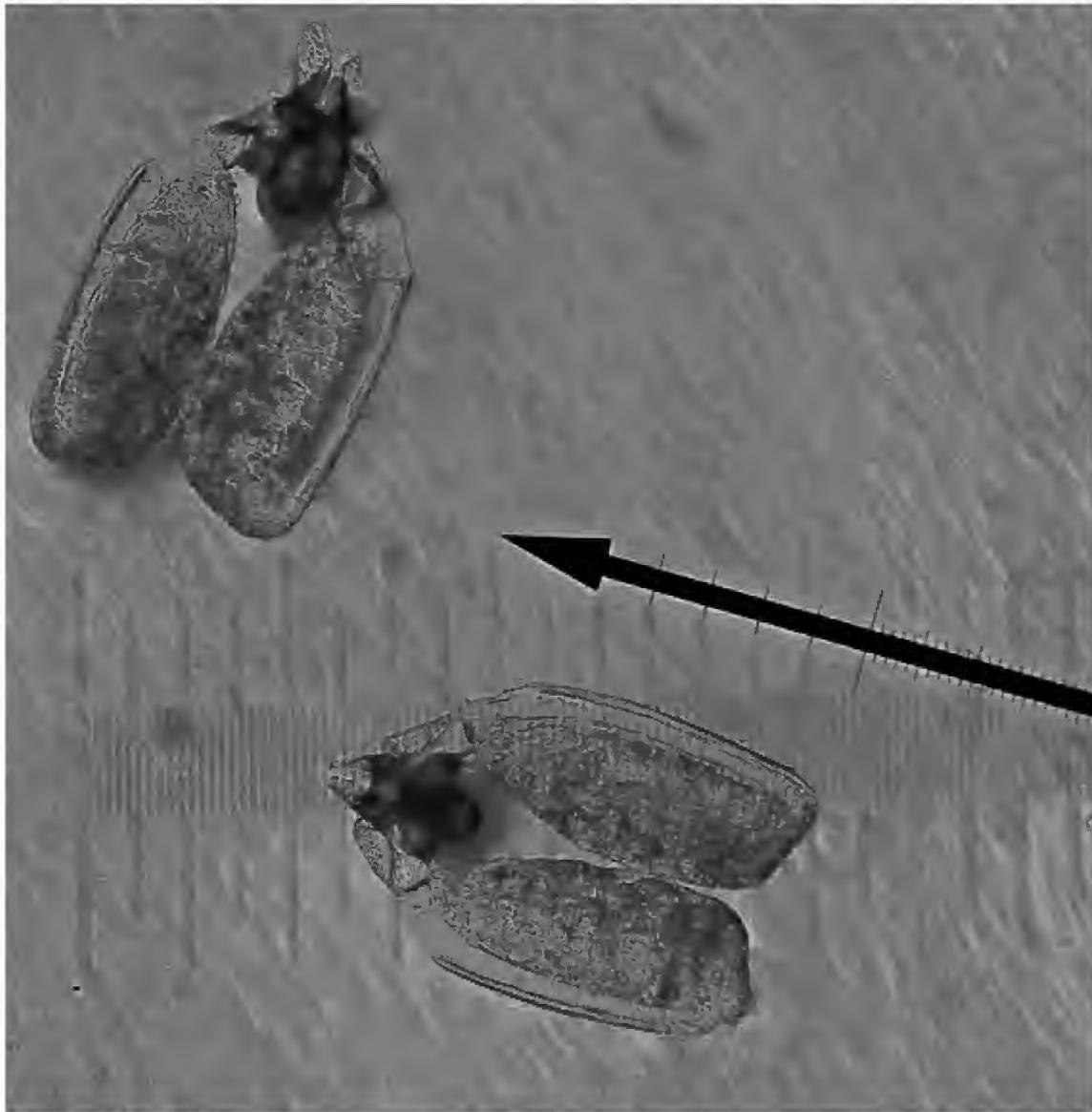
Translators

length	0.09 mm
widest	0.04 mm

Caudicle

bulb diam.	0.03 mm
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Hoya salmonnea Kloppenburg, Guevarra, Mendoza & Ferreras
holotypus 14622 (PUH) ISSN 2329-7336 2013



Pollinaria (2) enlarged ca. 150x.

Pollinium:

length	0.35 mm
widest	0.14 mm

Translator:

length	0.09 mm
widest	0.04 mm

Retinaculum:

length	0.10 mm
shoulder	0.10 mm
waist	0.04 mm
hip	0.07 mm
ext.	0.05 mm

Caudicle

bulb diam	0.04 mm
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Type: G

Translator/caudicle type: d/o

Retinacula character: S

Pollinia apex type: T

***Hoya salmonnea* subsp. *pallida* Kloppenburg, Mendoza & Ferreras
2013**

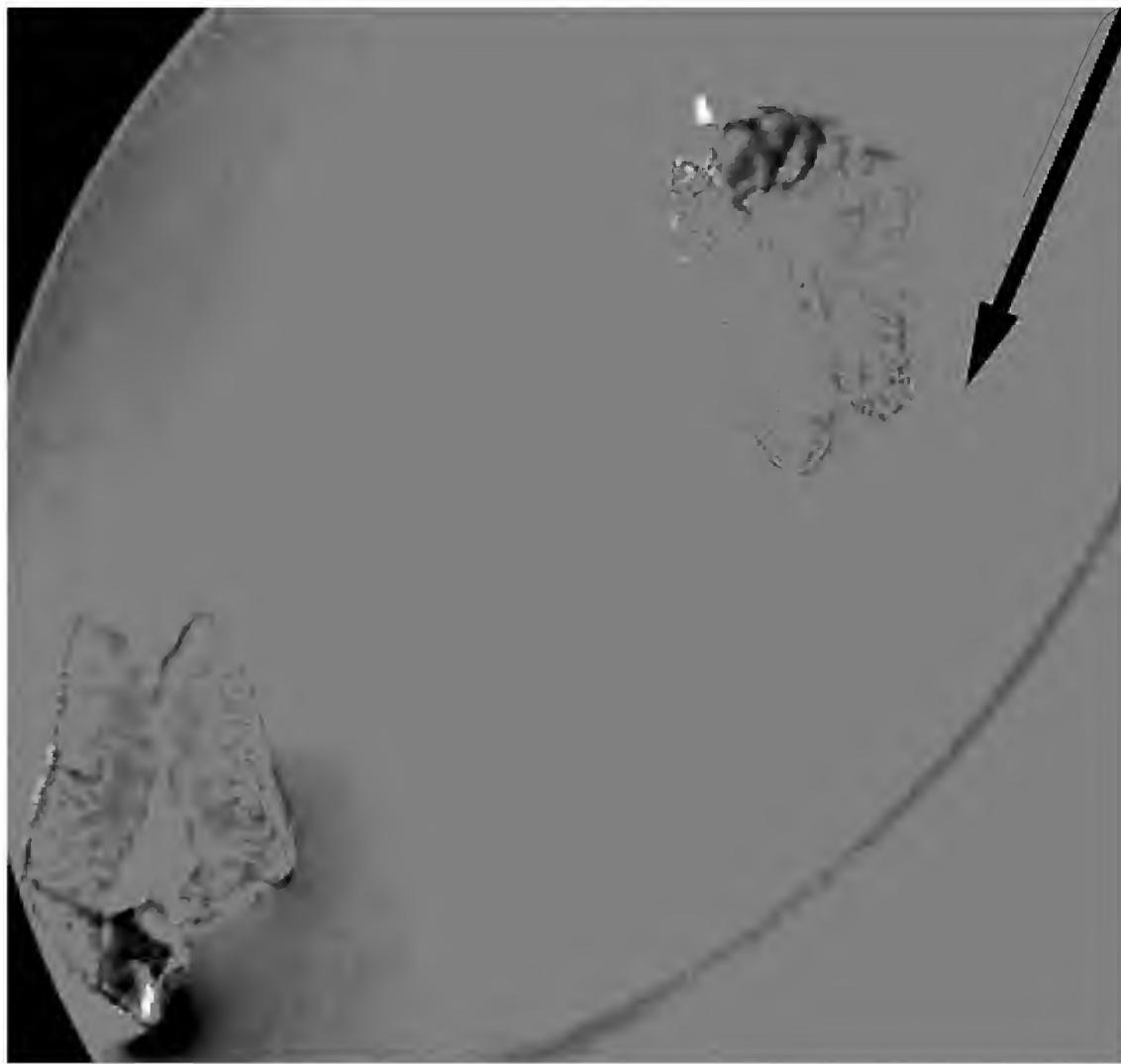


Photo above of two pollinaria enlarged ca. 110x.



Pollinia from several flowers all somewhat deformed, shriveled (the pollinia) the upper right one seems best for measurements.

Pollinium

length	0.35 mm
widest	0.17 mm

Retinaculum

length	0.10 mm
shoulders	0.15 mm

Translator		waist	0.07 mm
length	0.11 mm	hip	0.11 mm
widest	0.05 mm	ext.	0.08 mm

Caudicle

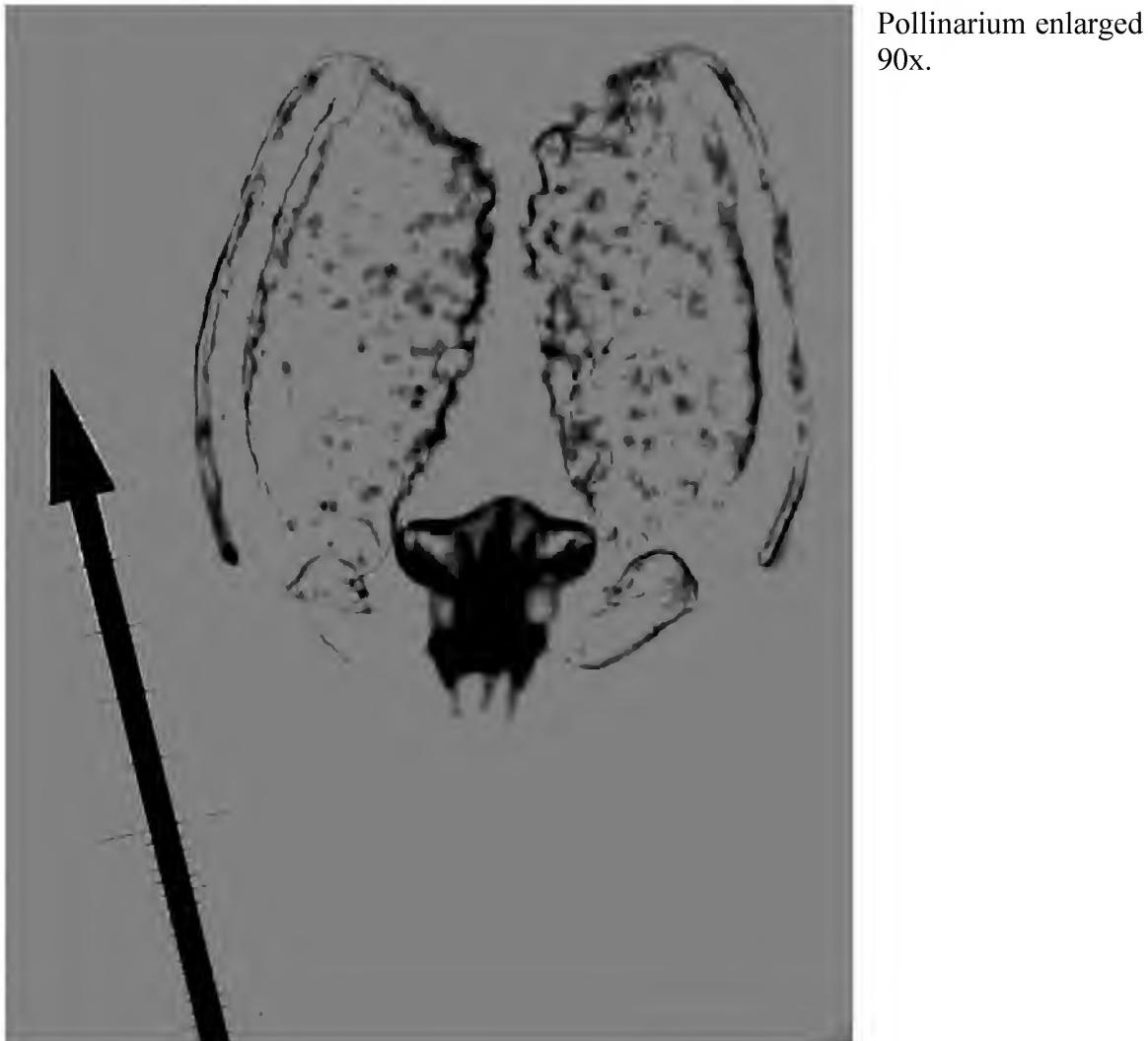
Translator/caudicle type: d/o **Caudicle**
 bulb diam. 0.05 mm

Pollinia apex type: T

Caudicle bulb type: G

Retinacula character: S

***Hoya blashernaiaeii* subsp. *luzonensis* Kloppenburg & Mendoza**
(unpublished) GM #160



Pollinarium enlarged
90x.

Pollinium

length	0.34 mm
widest	0.22 mm

Caudicle

bulb diam. 0.06 mm

Retinaculum

length	0.12 mm
shoulder	0.13 mm
waist	0.05 mm
hip	0.10 mm
ext.	0.08 mm

Translator/caudicle type: d/o

Pollinia apex type: T

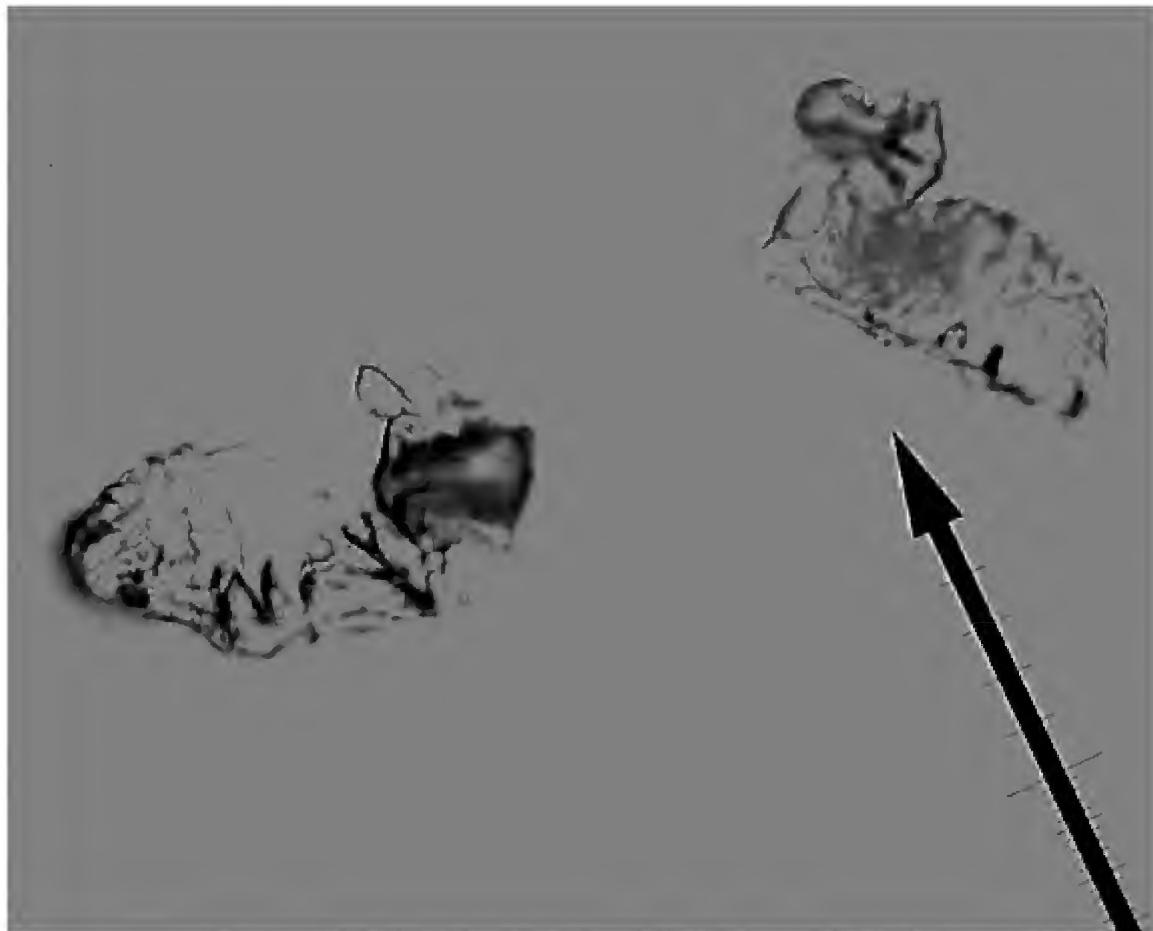
Caudicle bulb: C

Retinacula character: S

Translator

length	0.12 mm
widest	0.04 mm

***Hoya blashernaiaeii subsp. rosea* Kloppenburg**
AC #5
(unpublished)



Pollinarium enlarged ca. 140x.

Pollinium

length	0.32 mm
widest	0.15 mm

Translator/caudicle type: d/o

Pollinia inner end type: R

Retinaculum

length	0.15 mm
shoulder	0.10 mm
waist	0.05 mm
hip	0.08 mm
ext.	nil or possibly 0.1 mm

Caudicle bulb: ?

Retinacula character: S

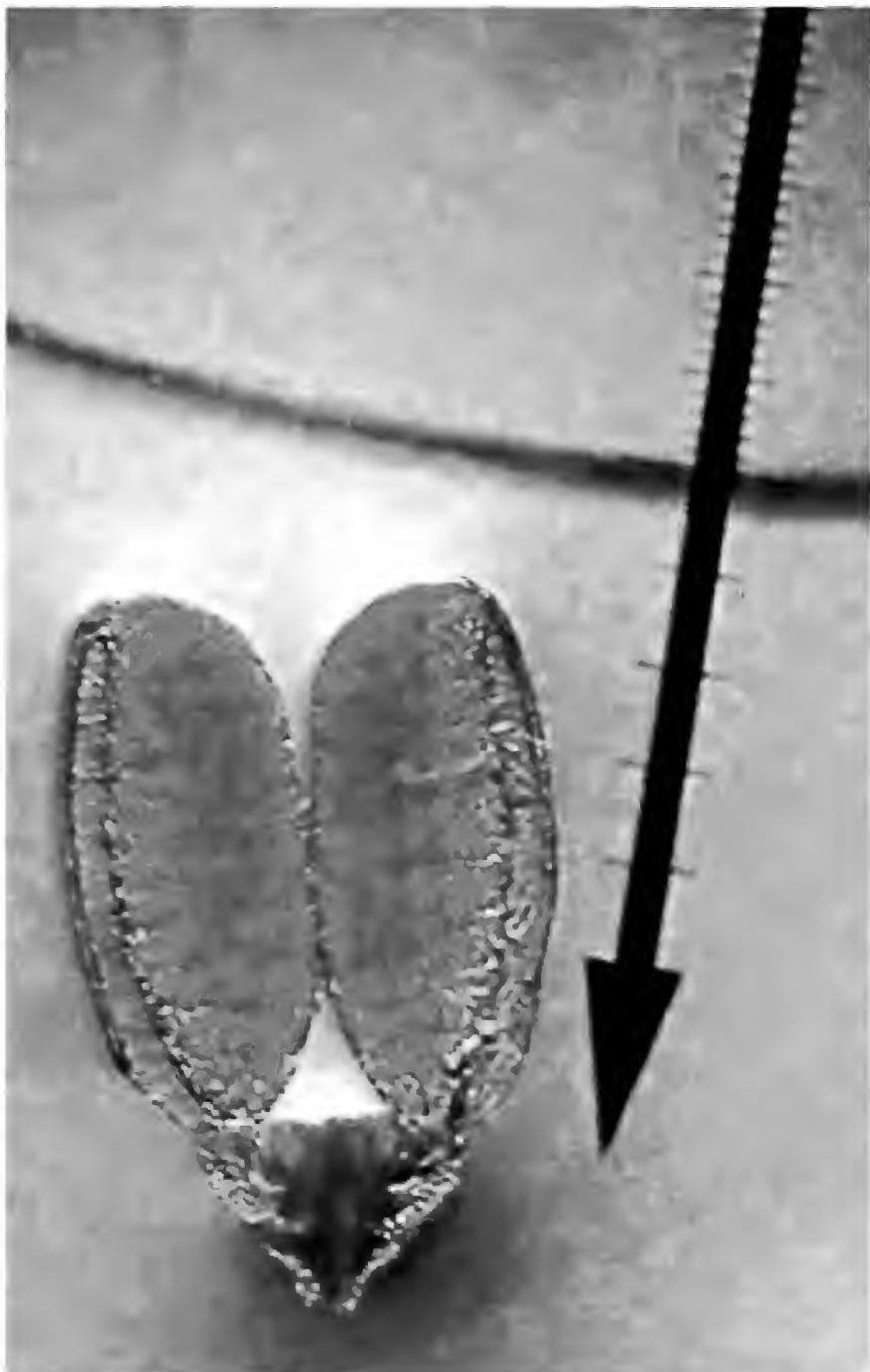
Translator

length	0.10 mm
wide	0.04 mm

Caudicle

bulb diam. 0.05 mm

***Hoya bifunda* subsp. *obtusa* Kloppenburg & Mendoza
(unpublished) GM #12**



Pollinarium
enlarged ca. 250x.

Pollinium
length 0.29 mm
widest 0.13 cm

Retinaculum
length 0.06 mm
shoulder 0.08 mm
waist 0.06 mm
hip 0.05 mm
ext. 0.04 mm

Translator
length 0.07 mm
depth 0.02 mm

Caudicle
bulb diam. 0.04 mm

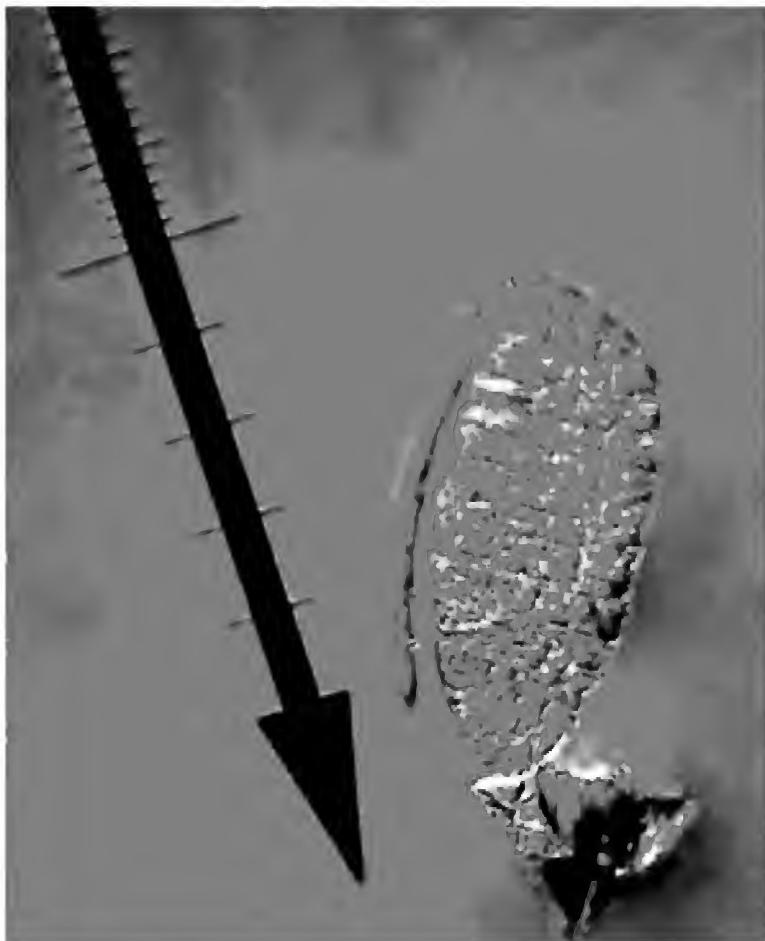
**Translator/
Caudicle
type:** closest to d/o

Ratios: p/w 2.2
p/r 3.6

Pollinia end type:
R

Caudicle bulb: G

Retinacula character: LS



Pollinaria enlarged ca.
250x.

Pollinium

length	0.26 mm
widest	0.13 mm

Retinaculum

length	0.06 mm
shoulder	0.09 mm
waist	0.03 mm
hip	0.06 mm
ext.	0.03 mm

Translator

length	0.05 mm
widest	0.02 mm

Caudicle

bulb diam. 0.03 mm

Type: C

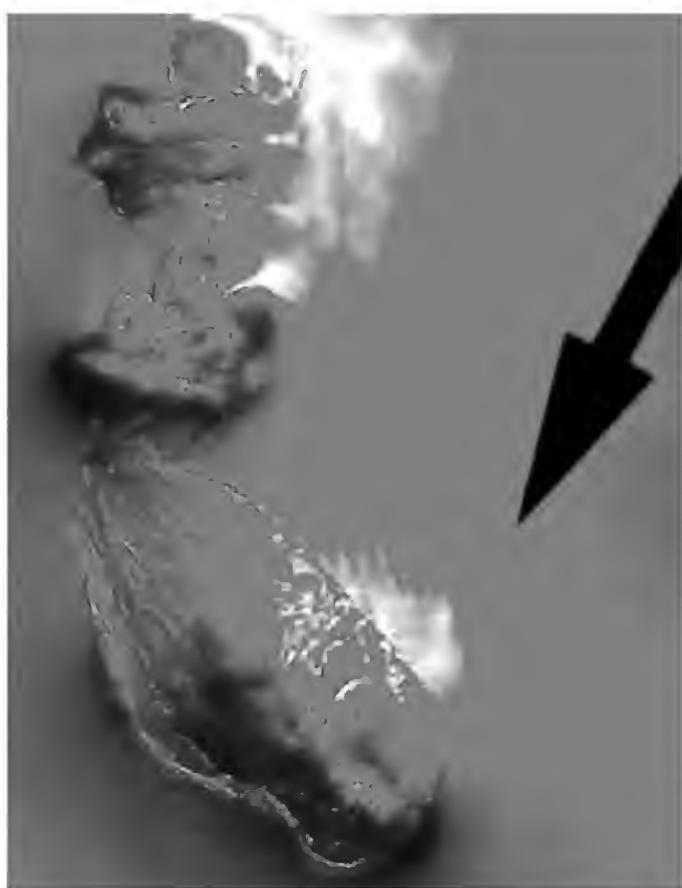
Translator/caudicle type:
d/o

Pollinia inner end type: R

Caudicle bulb: C ?

Retinacula character: HU

Hoya albida Kloppenburg, Cajano, Guevarra & Carandang 2013
Type clone



Two retinacula with translators and one pollinium enlarged ca. 330x.

Pollinium

length	0.25 mm
widest	0.09 mm

Retinaculum

length	0.10 mm
shoulder	0.08 mm
waist	0.04 mm
hip	0.05 mm
ext.	0.02 mm

Translator

length	0.05 mm
depth	0.02 mm

Ratios: p/r 2.5 p/w 2.8

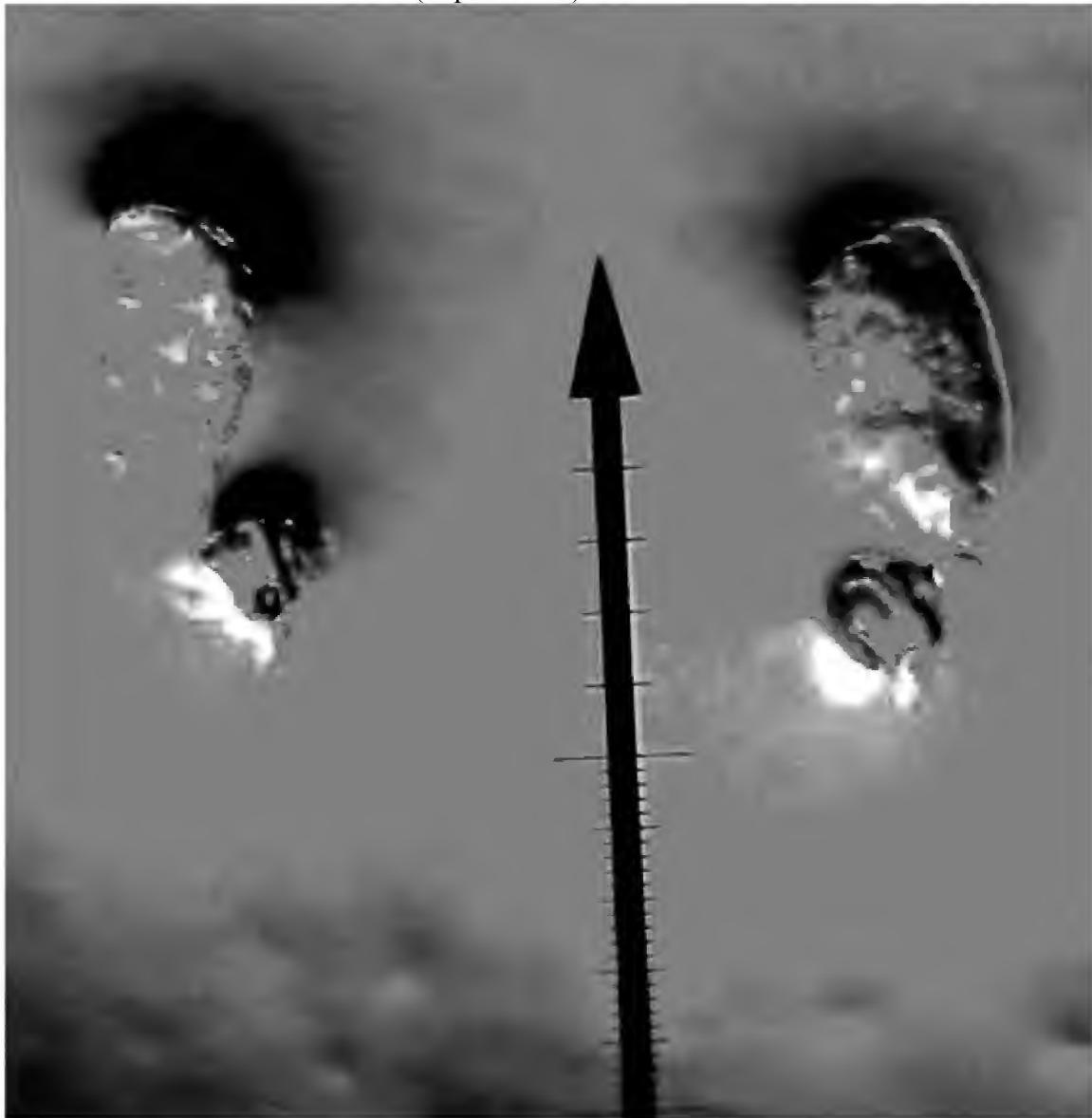
Translator /caudicle type: d/o

Pollinia end type: R

Caudicle bulb: ?

Retinacula character: S

Hoya maubanensis Kloppenburg & Mendoza
(unpublished) GM #66



Pollinaria enlarged ca. 190x.

Pollinium

length	0.25 mm
widest	0.13 mm

Translator

length	0.06 mm
widest	0.02 mm

Retinaculum

length	0.08 mm
shoulder	0.09 mm
waist	0.05 mm
hip	0.06 mm
ext.	0.02 mm

Caudicle

bulb diam. 0.04 mm

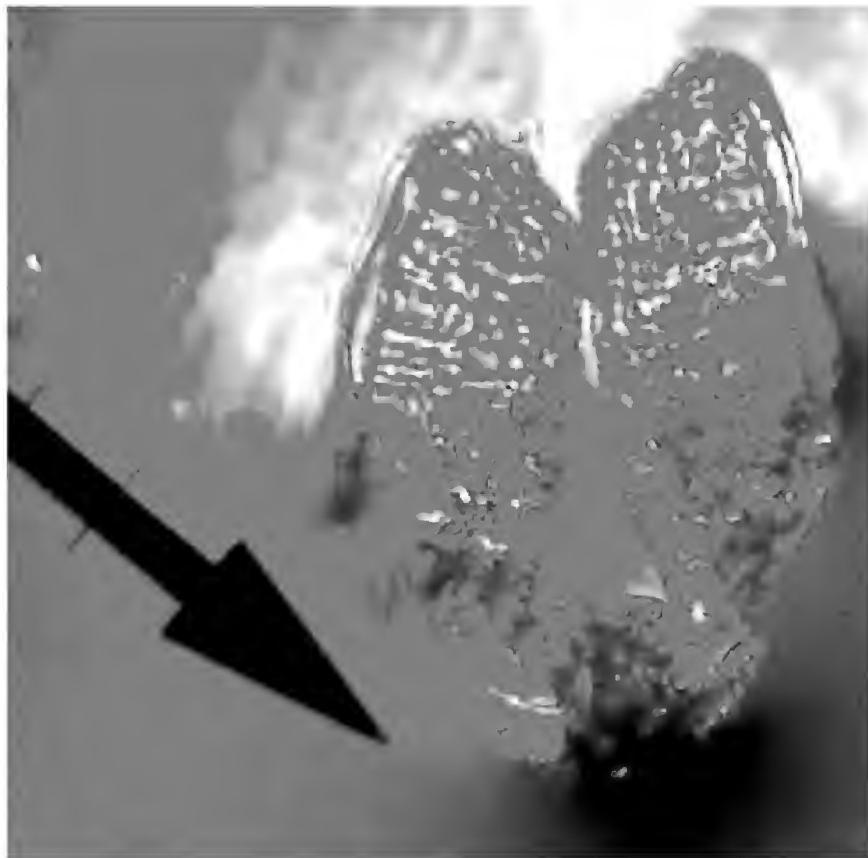
Retinacula character: S

Translator/caudicle type: d/o

Pollinia end type: R

Caudicle bulb: ?

Hoya williamsiana Kloppenburg, Siar, Mendoza, Cajano, Guevarra & Carandang 2013



Pollinarium enlarged ca. 450x.

Pollinium		Ratios:	p/r	2.9	p/w	2.0
length	0.20 mm					
widest	0.10 mm					

Retinaculum

length	0.07 mm
shoulder	0.08 mm
waist	0.04 mm
hip	0.05 mm
ext.	0.03 mm

Translator/caudicle type: d/o

Caudicle

bulb diam. 0.02 mm

Translator

length 0.05 mm
depth 0.02 mm

Translator/caudicle type: d/o

Pollinia ends; T

Caudicle bulb; C

Retinacula character: S

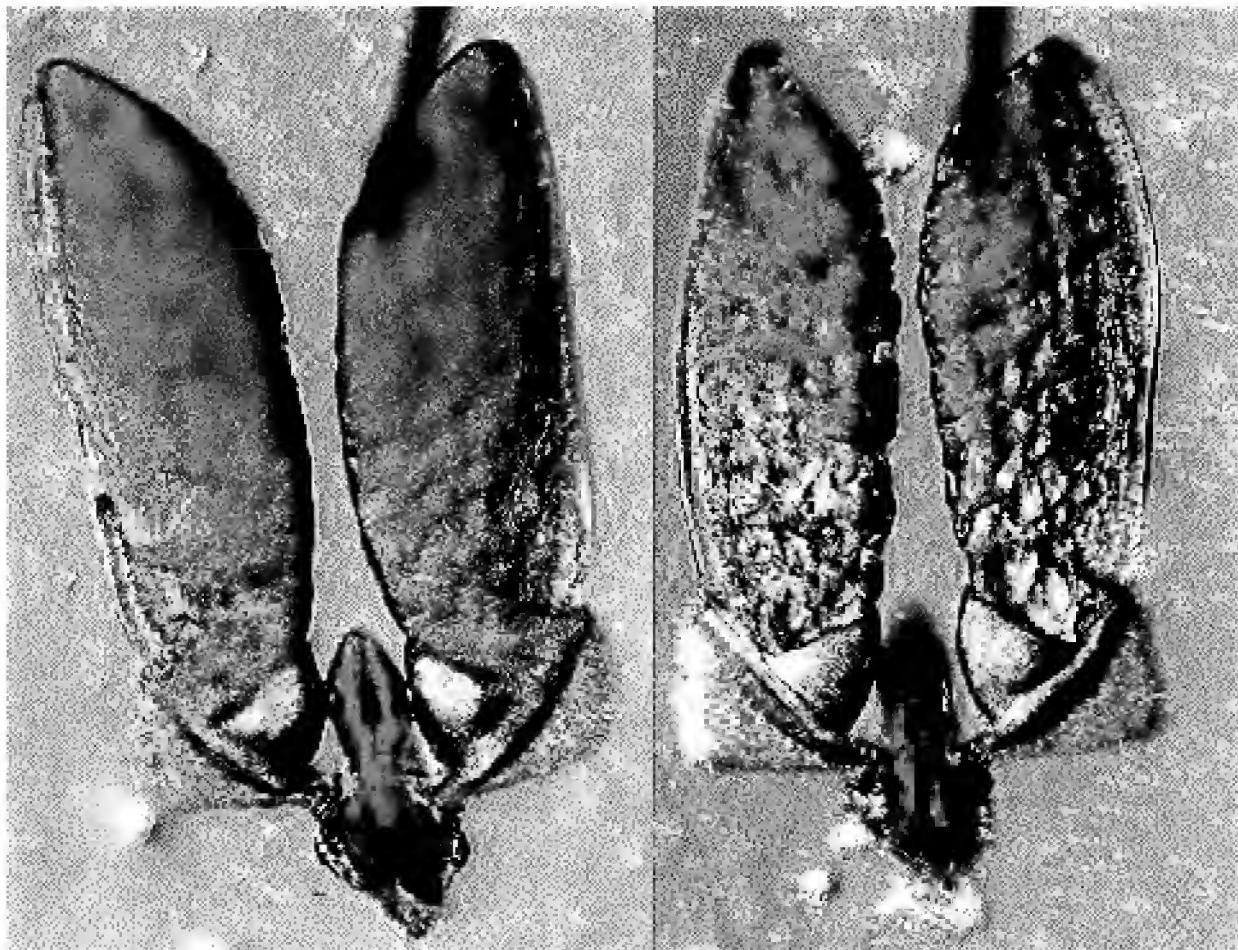
Pollinia Types 2018-5

t/o or t/cw

1. **Hoya plicata** King & Gamble 1908
2. **Hoya** sp. Tioman Island, Malaysia Ted Green
3. **Hoya kanyakumariana** Henry 1978
4. **Hoya** sp. NH #1 (Vanuatu)
5. **Hoya penta** Kloppenburg & Mendoza
6. **Hoya kastbergii** Kloppenburg 2003
7. **Hoya imbricata** Decaisne 1844 (mottled lf form)
8. **Hoya indentata** Kloppenburg & Mendoza
9. **Hoya loheri** subsp. **tanawanensis** Kloppenburg & Mendoza 2015
10. **Hoya acanthotruncata** Kloppenburg & Mendoza
11. **Hoya tingkoyanensis** Kloppenburg & Mendoza 2015

Hoya plicata King & Gamble 1908

Pollinarium from clone #81036 collected at Ula Kali, Malaysia.



Two pollinaria at different focal lengths, namely to show the detail of the translators and caudicles, here enlarged about 165x. The pollinia are long, truncated at the apex, and with a narrow vacuole inside form the pellucid margin. The retinaculum is long especially the head area with a broad hip area. The most outstanding feature here is the exceptionally well differentiated caudicle which envelope the whole attached end of the pollinia and nearly block it from view with their fine granular or stippled surface (most all caudicles in hoyas are clear). Note also the actual structured quality of the caudicle especial discernable on the left hand Pollinarium. The translators as usual are wedge shaped the broader portion supporting this complex caudicle.

Pollinaria:

Pollinium

length:	0.55 mm
widest:	0.19 mm

Retinaculum

length:	0.20 mm
shoulder:	0.07 mm
waist	0.05 mm
hip:	0.08 mm
extensions	0.05 mm

Translators

length:	0.19 mm
depth:	0.10 mm

Caudicle

bulb diam. 0.10 mm

Translator/caudicle type: t/cw

Pollinia apex type: T

Caudicle bulb: G

Retinacula character: E

Hoya sp. Tioman Island, Malaysia Ted Green
Hoya plicata ?



Pollinium

length	0.55 mm
widest	0.18 mm

Retinaculum

length	0.17 mm
shoulders	0.08 mm
waist	0.04 mm
hip	0.09 mm
ext.	0.05 mm

Translators

length	0.22 mm
widest	0.07 mm
top depth	0.03 mm

Caudicle

bulb diam.	0.11 mm
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Translator/caudicle type: t/cw

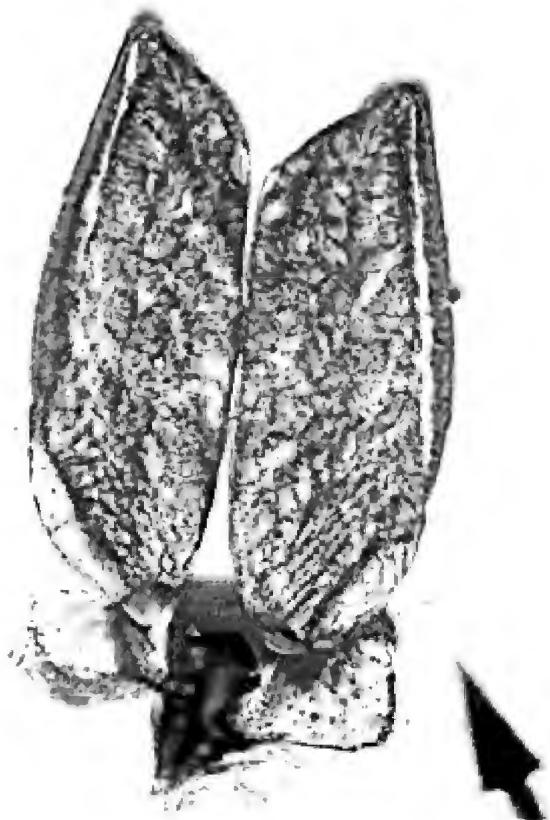
Pollinia apex type: RT

Caudicle bulb: C

Retinacula character: E

Hoya kanyakumariana Henry 1978

from flowers at Ted Green's October 2003



Pollinaria enlarged about 165x.
Pollinia inner apices truncate inwardly.
Translators are delta shaped enlarged with
rounded outer apices, surface somewhat
granulose.

Pollinium

length	0.46 mm
widest	0.16 mm

Retinaculum

length	0.11 mm
shoulder	0.06 mm
waist	0.05 mm
hips	0.08 mm
extensions	0.02 mm

Caudicle

bulb diam	0.05 mm
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Translator Type: t/cw

Pollinia inner end type: F

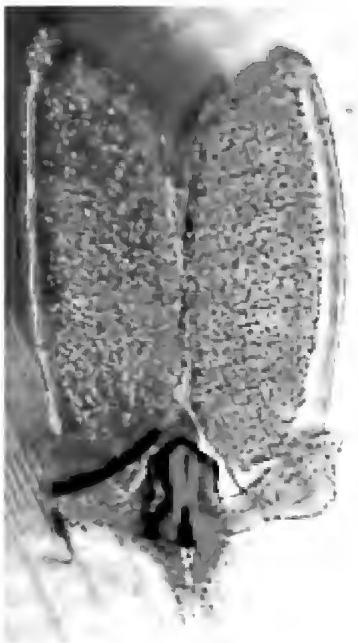
Caudicle bulb: C

Retinacula character: S

Hoya sp. NH #1 (Vanuatu).

Flower from Ann Wayman

Magnified approximately 165x.



Pollinium

length:	0.45 mm
widest:	0.17 mm

Retinaculum

length:	0.12 mm
shoulder:	0.12 mm
waist:	0.06 mm
hip:	0.10 mm
ext.:	0.08 mm

Translators

length:	0.02 mm
depth:	0.06 mm

Caudicle

bulb diam:	0.07 mm
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Translator caudicle type: t/cw

Pollinia inner end type: F

Caudicle bulb: G

Retinacula character: S ?

Hoya penta Kloppenburg & Mendoza
(unpublished) GM #55



Pollinarium above enlarged ca. 120x

Pollinium

length	0.44 mm
widest	0.15 mm

Translator/caudicle type: tp/cw

Retinaculum

length	0.10 mm
shoulder	0.06 mm
waist	0.05 mm
hip	0.07 mm
ext	0.02 mm

Pollinia end type: T

Retinacula type: S

Translator

Length	0.17 mm
Widest	0.10 mm

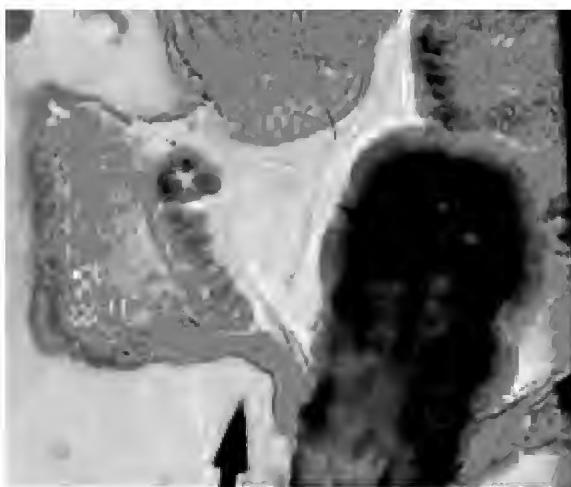
Caudicle

bulb top	0.10 mm
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Caudicle bulb: G

Hoya kastbergii Kloppenburg 2003

Type material 203003 (UC)



Magnified over 400z is the translator caudicle area of the pollinarium showing how the darker (more structured) translator arm supports the clear caudicle; both narrow greatly as they enter the retinaculum, where they are attached internally. The translators and bulbous clear pollywog like caudicles enter the retinaculum at the hip area. The translators support the caudicle, which in turn adheres to the pollinium. The bi-symmetrical nature of the retinaculum is due to secretions from a split in the top of the stigmatic surface.



A distinctive pollinarium, with delta winged translator arms.

Pollinia

length	0.44 mm
widest	0.18 mm

Retinaculum

length	0.17 mm
head	0.07 mm
waist	0.04 mm
hip	0.06 mm
extensions	0.06 mm

Translators are delta wing shaped from

ret - lower end	0.12 mm
outer edge	0.10 mm

Caudicle

bulb	0.07 mm
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Translator/caudicle type: t/cw

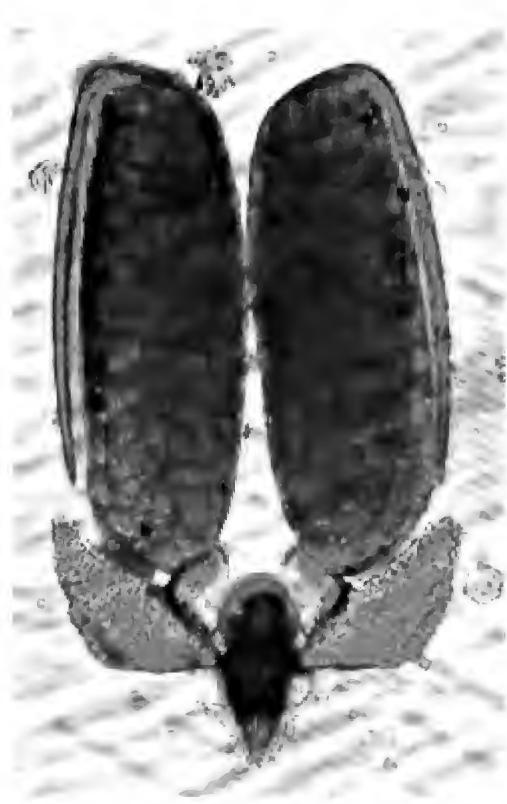
Pollinia apex type: T

Caudicle bulb: C

Retinacula character: E

Hoya imbricata Decaisne 1844

Flower from Ted Green, Hawaii
Mottled leaf clone from Palawan, Philippines.



Magnified approximately 165x.

Pollinium

length:	0.43 mm
widest:	0.16 mm

Retinaculum

length:	0.13 mm
shoulder:	0.07 mm
waist:	0.05 mm
hip:	0.07 mm
ext.:	0.03 mm.

Translators

length:	0.22 mm
depth:	variable

Caudicle

bulb diam.:	0.07 mm
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Translator/caudicle type: t/o

Pollinia inner end type: R

Caudicle bulb: ?

Retinacula character: R

Hoya indentata Kloppenburg & Mendoza
(unpublished) GM #91



Pollinaria enlarged ca.
120x.

Pollinia

length	0.40 mm
widest	0.12 mm

Retinaculum

length	0.10 mm
shoulder	0.08 mm
waist	0.05 mm
hip	0.07 mm
ext.	0.05 mm

Translator is truncate type
basal length 0.10 mm
vertical rise 0.12 mm
stem 0.02 mm

Caudicle
bulb diam. 0.08 mm

Translator/caudicle type:
tb/cw

Pollinia end type: RT

Caudicle bulb: ?

***Hoya loheri* subsp. *tanawanensis* Kloppenburg & Mendoza 2015
GM #131**



Pollinaria parts enlarged 140x. I was unable to obtain an intact pollinaria even from 6 flowers.

Pollinia

length	0.30 mm
widest	0.15 mm

Retinaculum

length	0.07 mm
overall	0.12 mm
shoulder	0.05 mm
waist	0.04 mm
hip	0.05 mm
ext.	0.05 mm

Translator

length	0.14 mm
base shelf	0.06 mm

Caudicle

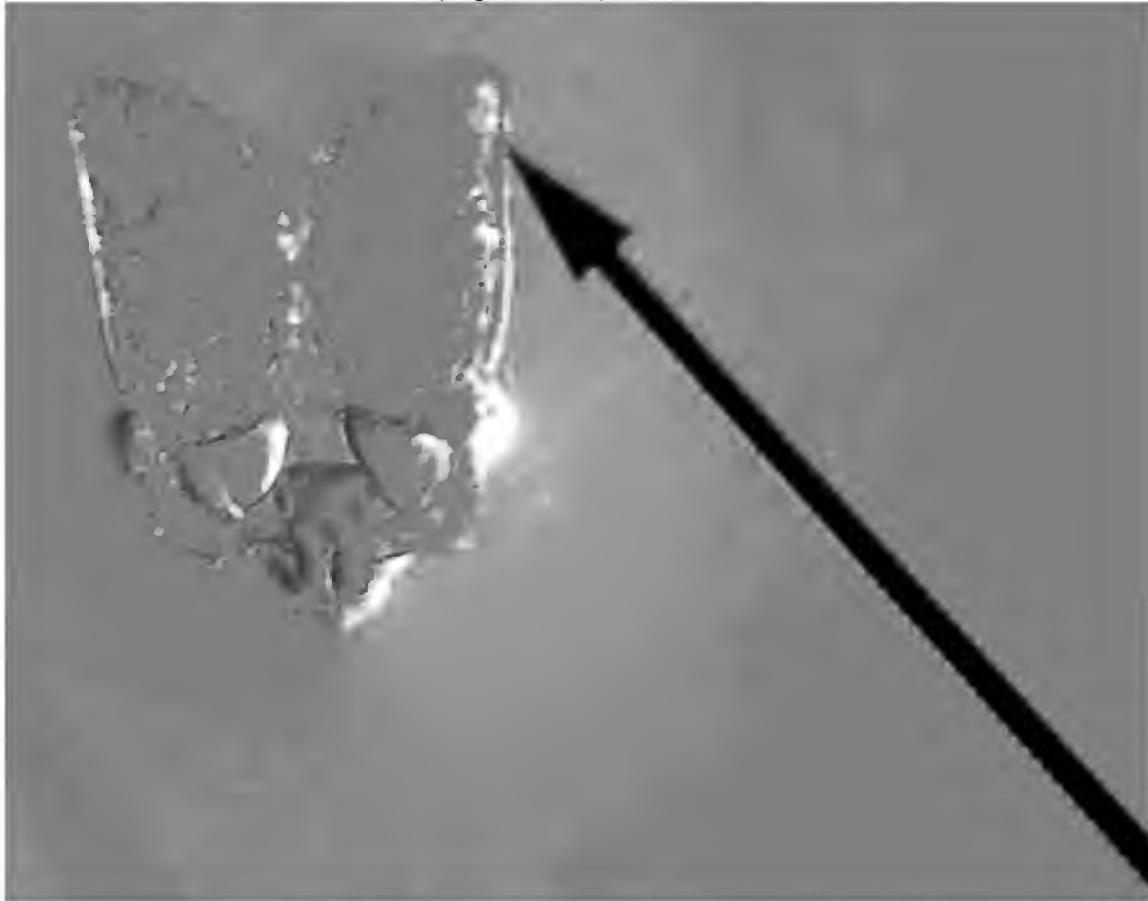
bulb. 0.12 x 0.05 mm

Pollinia inner end type:
T (tapered)

Retinacula type: HU
(hands up)

Translator/caudicle type: modified: T (truncate), here outer edge elongated upward culminating in a narrow apical area. t/o

Hoya acanthotruncata Kloppenburg & Mendoza
(unpublished) GM #42



Pollinarium above enlarged ca. 220x. The truncated translator is very rare in *Hoya* species, so far in the Section Acanthostemma I have only found it in *Hoya plicata* King & Gamble, this is the first species in this section from the Philippines with this character.

Pollinium

length	0.23 mm
widest	0.13 mm

Retinaculum

length	0.06 mm	length measured always from head to crotch
shoulder	0.06 mm	excludes the extensions.
waist	0.04 mm	
hip	0.05 mm	
ext.	0.04 mm	

Retinacula character: S

Translator

length out	0.08 mm
length up	0.06 mm

Translator/caudicle type: t/cw

Caudicle

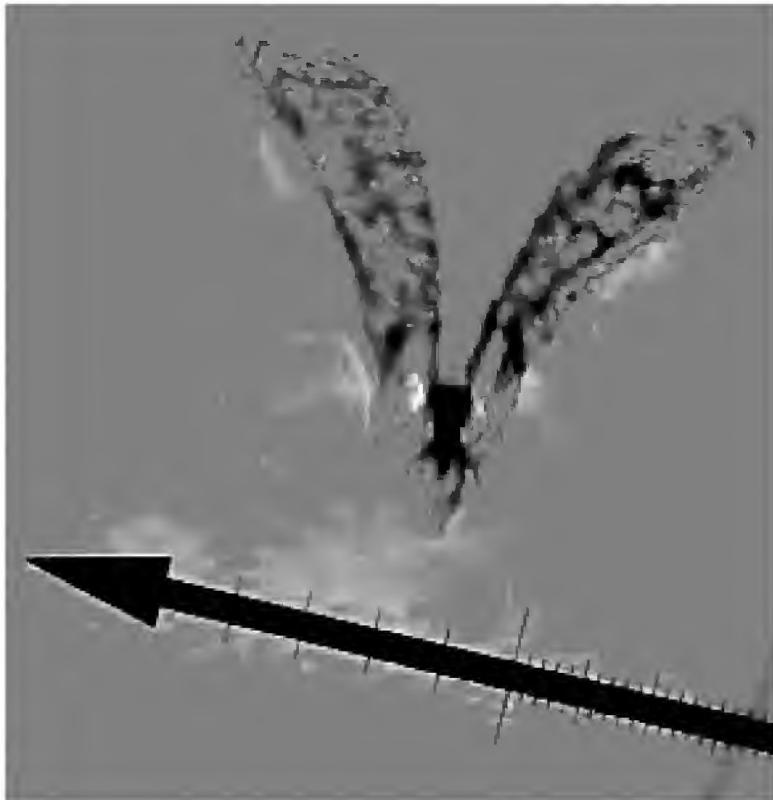
widest top	0.06 mm
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Pollinia inner end type: T

Type: C

from outer apex to retinacula 0.08 mm

Hoya tingkoyanensis Kloppenburg & Mendoza 2015
GM #203



Pollinarium enlarged about 190x.

Pollinium

length	0.18 mm
widest	0.10 mm

Retinacula

length	0.10 mm
shoulder	0.04 mm
waist	0.02 mm
hip	0.04 mm
ext.	0.02 mm

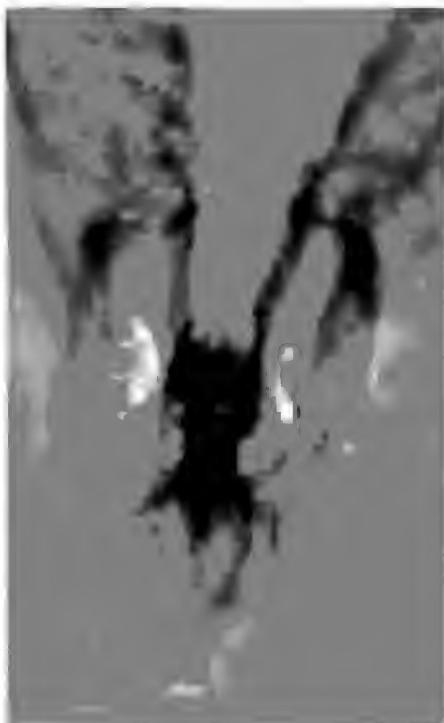
Translator

length	0.12 mm
widest	0.02 mm

Caudicle

bulb 0.10 x0.04 mm

The caudicle bulbs are the most unusual I have observed, oval and long and clear, also the translators are unusual. **As yet unclassified. !!!**



An enlargement to show the unusual translator shape and the elongated caudicle bulbs.

Pollinia inner end type: T (tapered)

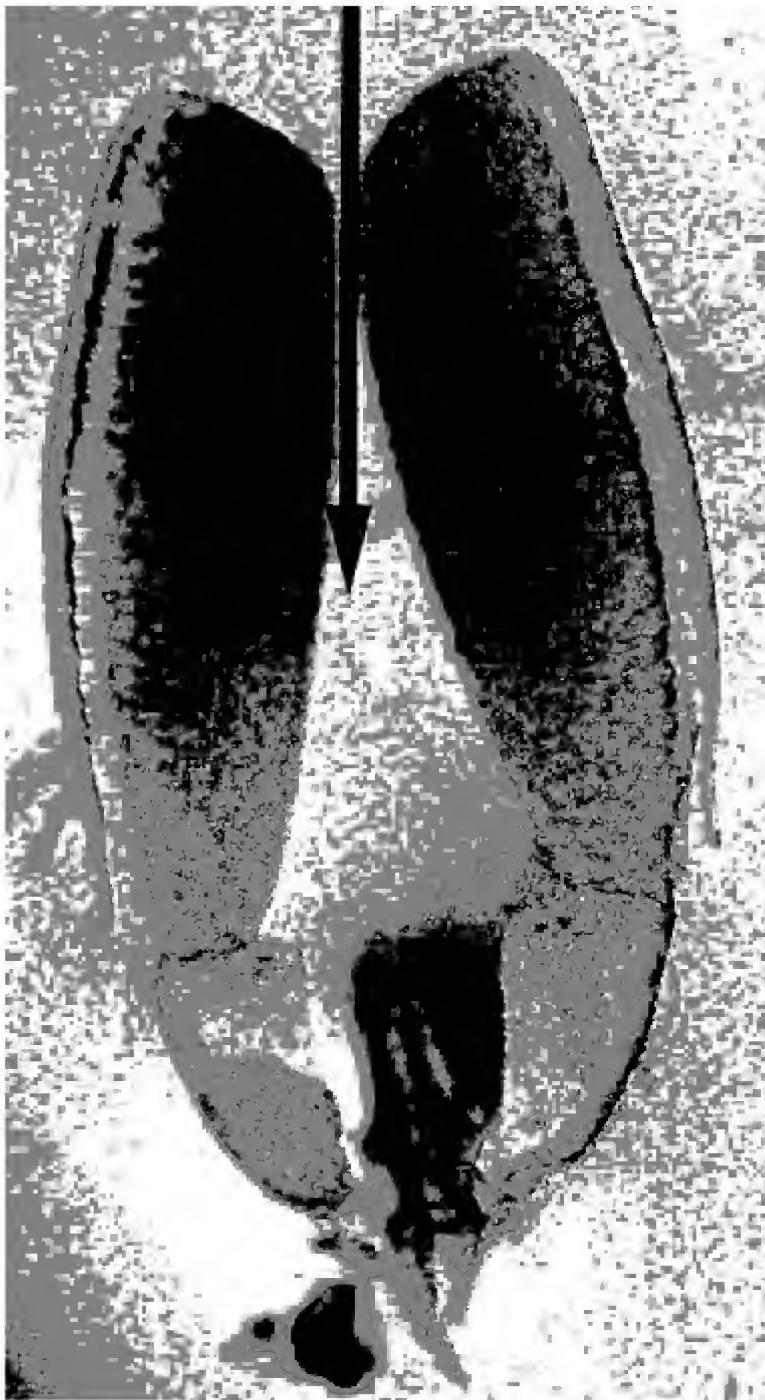
Retinaculum type: elongated "E", here the hips are broader than the shoulders, another unusual occurrence.

Translator/caudicle type: as yet unclassified.

Pollinia Types 2018-6
ls/cw or lb/cw

1. **Hoya cf. coriacea** Toba TG
2. **Hoya cf. halconensis** Kloppenburg 1990 NS 05-213
3. **Hoya cf. halconensis** Kloppenburg 1990 NS 05-225
4. **Hoya sp. Mt. Halcon, Philippines** 1990 NS05-231
5. **Hoya sp. NS05-231 Mt. Halcon, Philippines**
6. **Hoya sp. 577**
7. **Hoya williamoliveriana** Kloppenburg, Cajano & Hadsall 2015
8. **Hoya obtusata** Kloppenburg & Mendoza
9. **Hoya aurea subsp. nagecarlanensis** Kloppenburg & Mendoza
10. **Hoya barbonii** Kloppenburg 2014
11. **Hoya minimapollinaria** Kloppenburg & Mendoza

Hoya cf. coriacea Toba TG



Pollinaria enlarged ca.
110x.

Pollinium

length	0.90 mm
widest	0.34 mm

Retinaculum

length	0.31 mm
shoulder	0.15 mm
waist	0.09 mm
hip	0.13 mm
extensions	0.09 mm

Translator

length	0.42 mm
wide	0.04 mm

Caudicle

dorsal	0.18 mm
length	0.30 mm

Translator /caudicle type:
ls/cw

Pollinia inner end type:
RT

Caudicle bulb: granulate

Retinacula character: R

Retinacular head long and narrow, shoulder area well down, hips with rounded surfaces. Length measurements are made from inner apex to the crotch and do not include the extensions.

Hoya cf. halconensis Kloppenburg 1990

Hoya sp. NS05-213



Pollinaria enlarged. Scale arrow length 0.10 mm long small marks on shaft 0.01 mm long.

Pollinarium:

length	0.89 mm long.
widest	0.26 mm

Retinaculum

length	0.34 mm
shoulder	0.14 mm
waist	0.05 mm
hip	0.09 mm

Translators

length	0.40 mm
width	0.02 mm

Translator/caudicle type: l/cw

Pollinia inner end type: T

Caudicle bulb diam. 0.18 mm

Caudicle bulb: clear

Retinacula character: HE

Hoya cf. halconensis Kloppenburg 1990

Hoya sp. NS05-225 Flowers given to me in IRI UPLB by Dr. Monina Siar 2006
This is the same sp. as NS05-213



Pollinaria enlarged about 165x. Reticle arrow is 0.10 mm long and head 0.05 mm wide, marks on the stem 0.05 mm long.

Pollinium

length 0.88 mm
widest 0.25 mm

Retinaculum

length 0.30 mm
head 0.14 mm
shoulder 0.15 mm
waist 0.09 mm
hip 0.10 mm
ext. 0.04 mm

Translators

length 0.30 mm
depth 0.02 mm

Caudicle

Cw 0.18 mm top

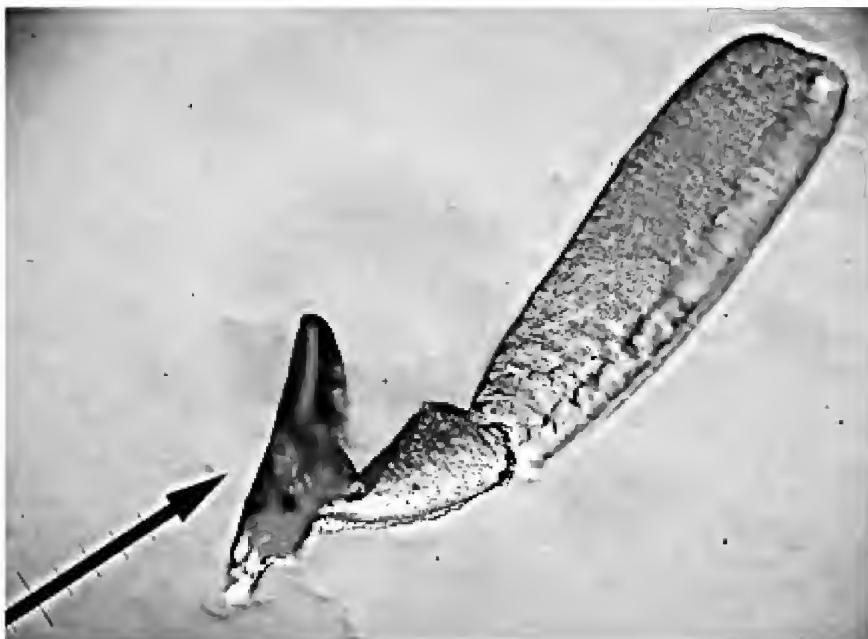
Translator/caudicle type: l/cw

Pollinia inner end type: T

Caudicle bulb: granulate

Retinacula character: R

Hoya sp. NS05-231 Mt. Halcon, Philippines
via Torill Nyhuus march 2007



Pollinum enlarged about 165x. The retinaculum is turned edgewise but appears to have a long head area translator and caudicle entering below the hip area. Translator is very narrow and caudicle bulb surface is cupped (structured). Pollinium is long, narrow and inner apex is rounded.

Pollinium

length	0.81 mm
widest	0.24 mm

Retinacula

length	0.38 mm
shoulders	0.30 mm
waist	0.14 mm
hip	0.18 mm
ext.	0.06 mm

Translator

length	0.33 mm
widest	0.01 mm

Caudicle

bulb diam.	0.15 mm
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Translator/caudicle type: l/cw

Pollinia inner end type: RT

Retinacula character: HE

Caudicle: G

Hoya sp. MT. 13

via May Tolentino, Manila. Philippines. 5 flowers in Solution from Torill Nyhuus
3/20/07



Pollinarium enlarged
about 165x.

Translator/caudicle type: ls/cw
Pollinium

length	0.76 mm
widest	0.27 mm

Pollinia end type: RT

Caudicle bulb: G

Retinacula character: E

Retinaculum

length	0.30 mm
shoulder	0.12 mm
waist	0.10 mm
hip	0.11 mm
ext.	0.01 mm

Translators

length	0.22 mm
depth	0.03 mm

Caudicle bulb diam. 0.16 mm

Hoya sp. 577

Flower from Ann Wayman Central Point, OR. USA.



Magnifies approximately 165x.

Pollinium

length:	0.55 mm
widest:	0.20 mm

Retinaculum

length:	0.16 mm
shoulder:	0.08 mm
waist:	0.05 mm
hip:	0.09 mm
ext.:	0.04 mm

Translators

length:	0.14 mm
depth:	0.05 mm

Caudicle

bulb. diam.:	0.09 mm
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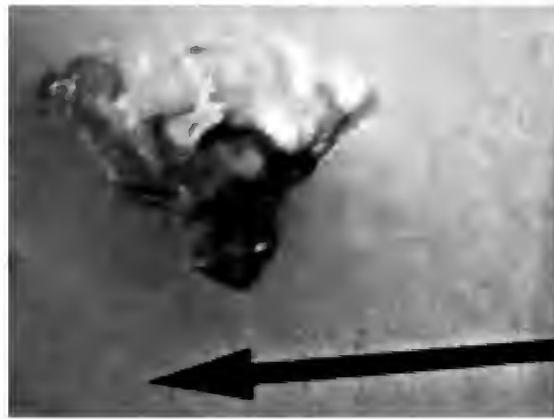
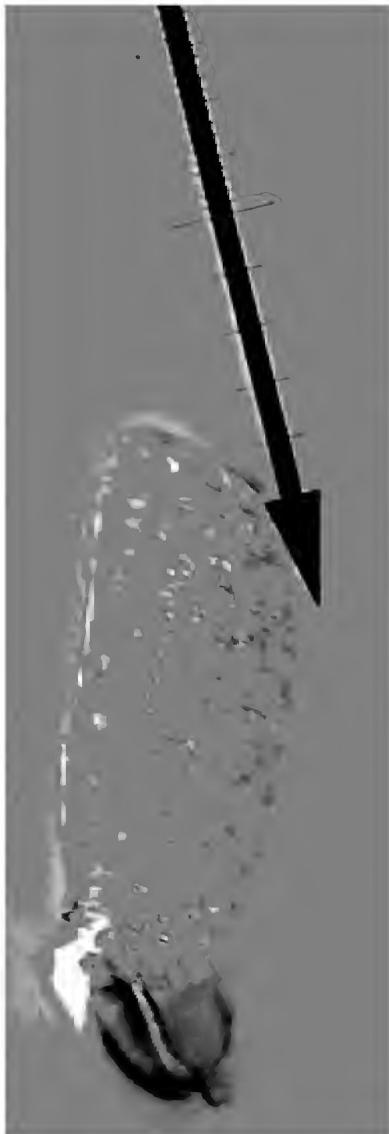
Translator/caudicle type: lb/cw

Pollinia apex type: T

Caudicle bulb: C

Retinacula character: S

***Hoya williamoliveriana* Kloppenburg, Cajano & Hadsall 2015**



Both photos of the pollinarium enlarged near 140x.

Pollinium

length	0.48 mm
widest	0.20 mm

Retinaculum

length	0.13 mm
shoulder	0.10 mm
waist	0.06 mm
hip	0.08 mm
ext.	0.02 mm

Translator

length	0.15 mm
wide	0.02 mm

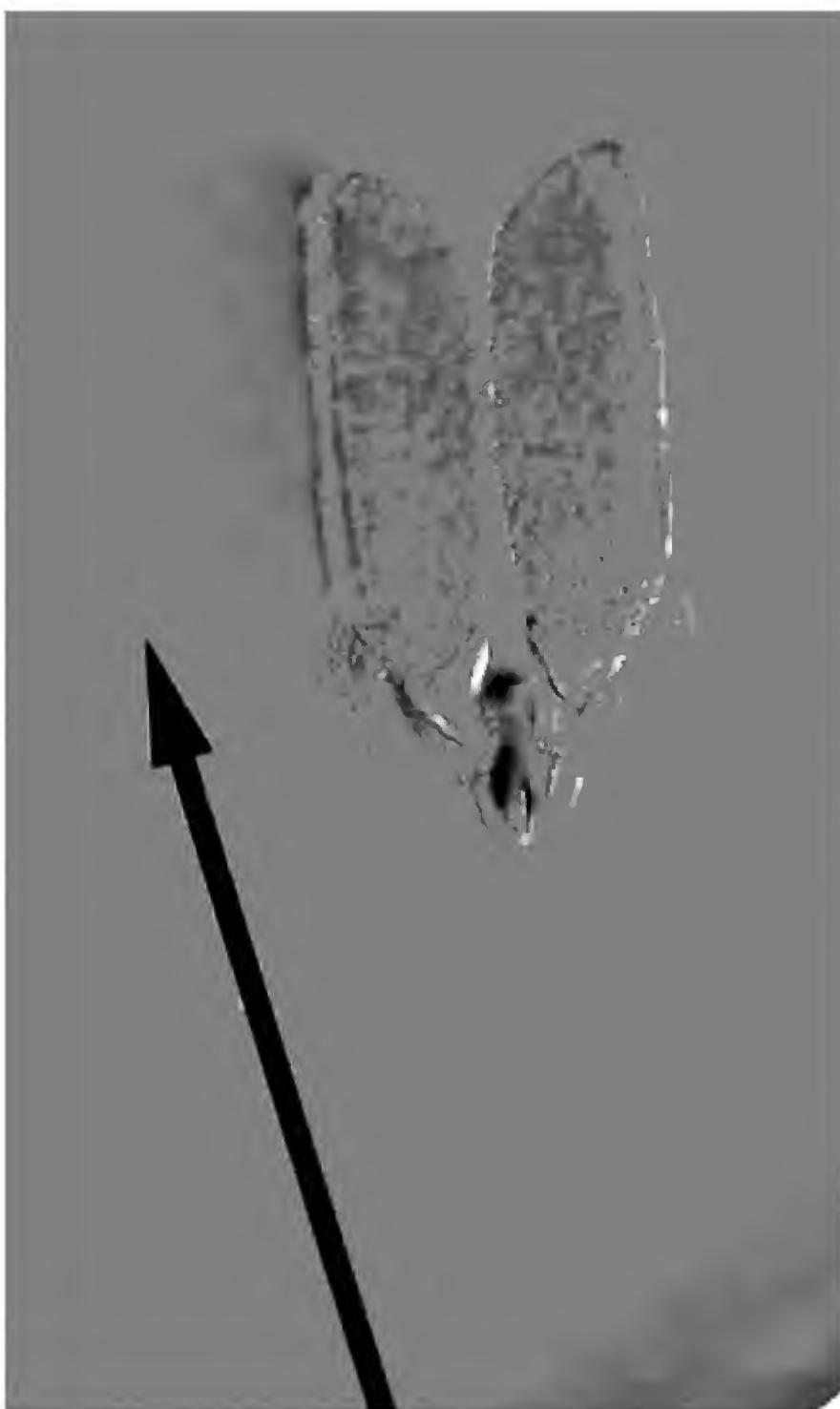
Caudicle

bulb diam;	0.06 mm
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Type: C (clear)

Translator/caudicle type: 1/cw ? **Pollinia inner end type:** T **Retinacula type:** R

Hoya obtusata Kloppenburg & Mendoza
(unpublished) GM #26



Pollinarium
enlarged 180x

Pollinium:
length 0.45 mm
widest 0.14 mm

Retinaculum:
length 0.08 mm
shoulder 0.05 mm
waist 0.03 mm
hip 0.05 mm
ext. 0.03 mm

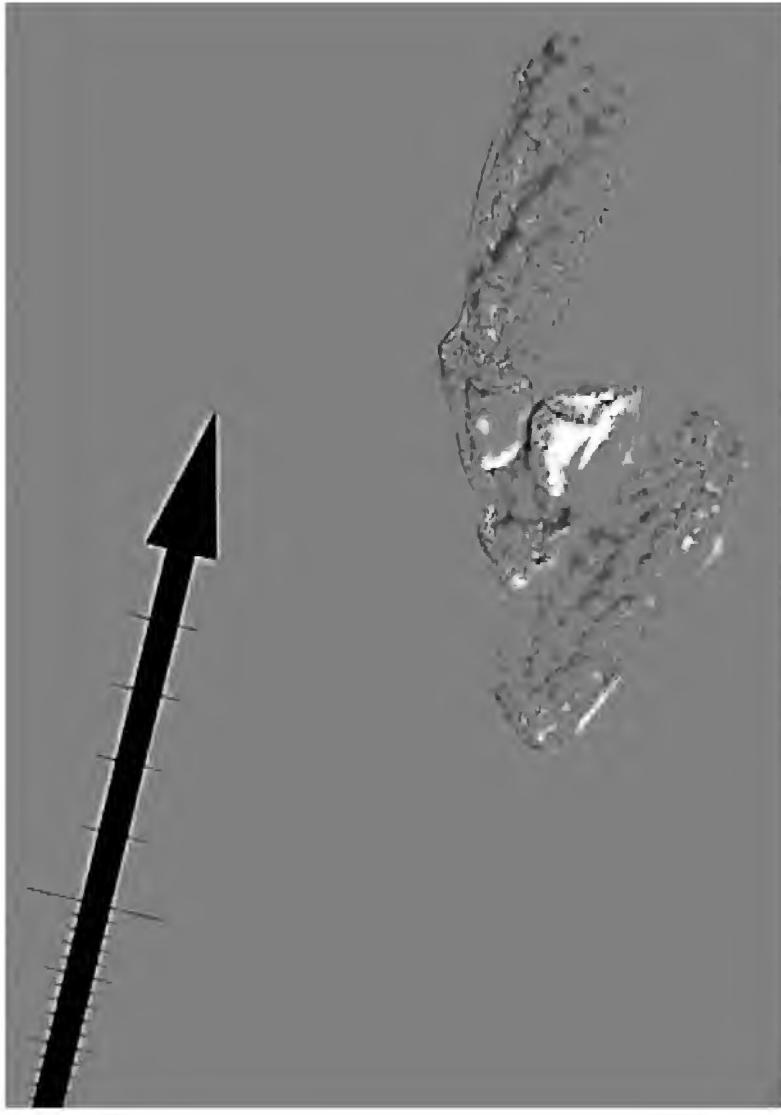
Translator:
length 0.19 mm
wide 0.06 mm

Caudicle:
bulb diam. 0.07 mm

**Retinacula
character: R**

Translator/caudicle type: lb/cw **Pollinia end type:** T **Caudicle bulb:** G

***Hoya aurea* subsp. *nagcarlanensis* Kloppenburg & Mendoza
(unpublished) GM #73**



Pollinaria enlarged ca.
158x.

Pollinium

length	0.28 mm
widest	0.09 mm

Retinaculum

length	0.08 mm
shoulder	0.06 mm
waist	0.03 mm
hip	0.05 mm
ext.	0.03 mm

Translator

length	0.09 mm
widest	0.03 mm

Caudicle

bulb 0.05 x 0.06 mm

Translator/caudicle type:
lb/cw

Pollinia end type: R

Caudicle bulb: C

Retinacula character: S

Hoya barbonii Kloppenburg 2014

sp. PNH 2175

Collected by Barbon, Alvarez, Garcia at Sibulan, Sta Maria in watershed area 8/31/91 An Acanthostemma sp. The pollinarium is very close to *Hoya obscure* var. *longipedunculata*.



Pollinarium enlarged about 125x.
Inner pollinia lobes are truncate,
translators are long and narrow
with clear caudicles visible.

Pollinium

length	0.28 mm
widest	0.11 mm

Retinaculum

length	0.13 mm
head	0.04 mm
hip	0.05 mm
ext.	0.02 mm

Translators

length	0.14 mm
widest	0.03 mm

Caudicle

bulb diam. 0.05 mm

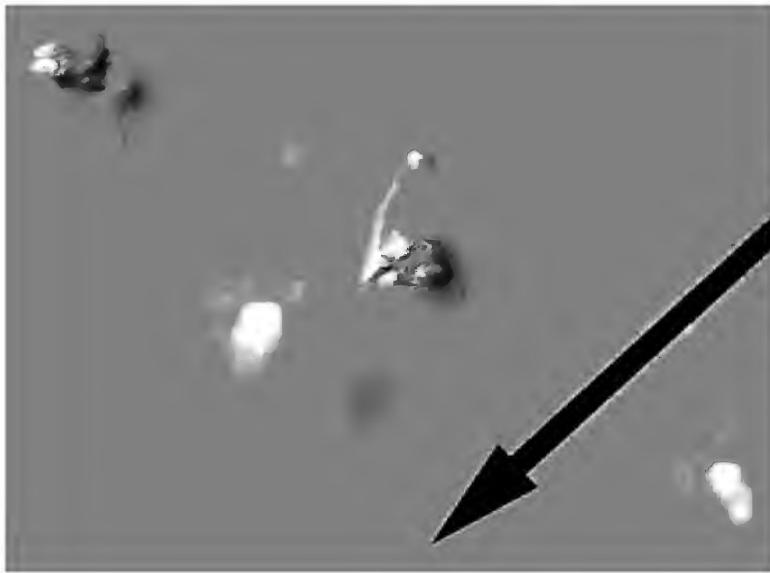
Type: C

Translator/caudicle type:
lb/cw

Pollinia end type: T

Caudicle bulb: C

Retinacula character: LS



Pollinaria enlarged ca. 150x. This is among the smallest of hoyo pollinaria and difficult to remove and photograph.

Pollinium

length	0.15 mm
widest	0.06 mm

Retinaculum

length	0.06 mm
shoulder	0.07 mm
waist	0.03 mm
hip	0.05 mm
ext.	0.03 mm

Translator

length	0.12 mm
widest	0.03 mm

Caudicle most likely cw

This is the shortest pollinaria I have worked with.
not pictured above.

Retinacula: S

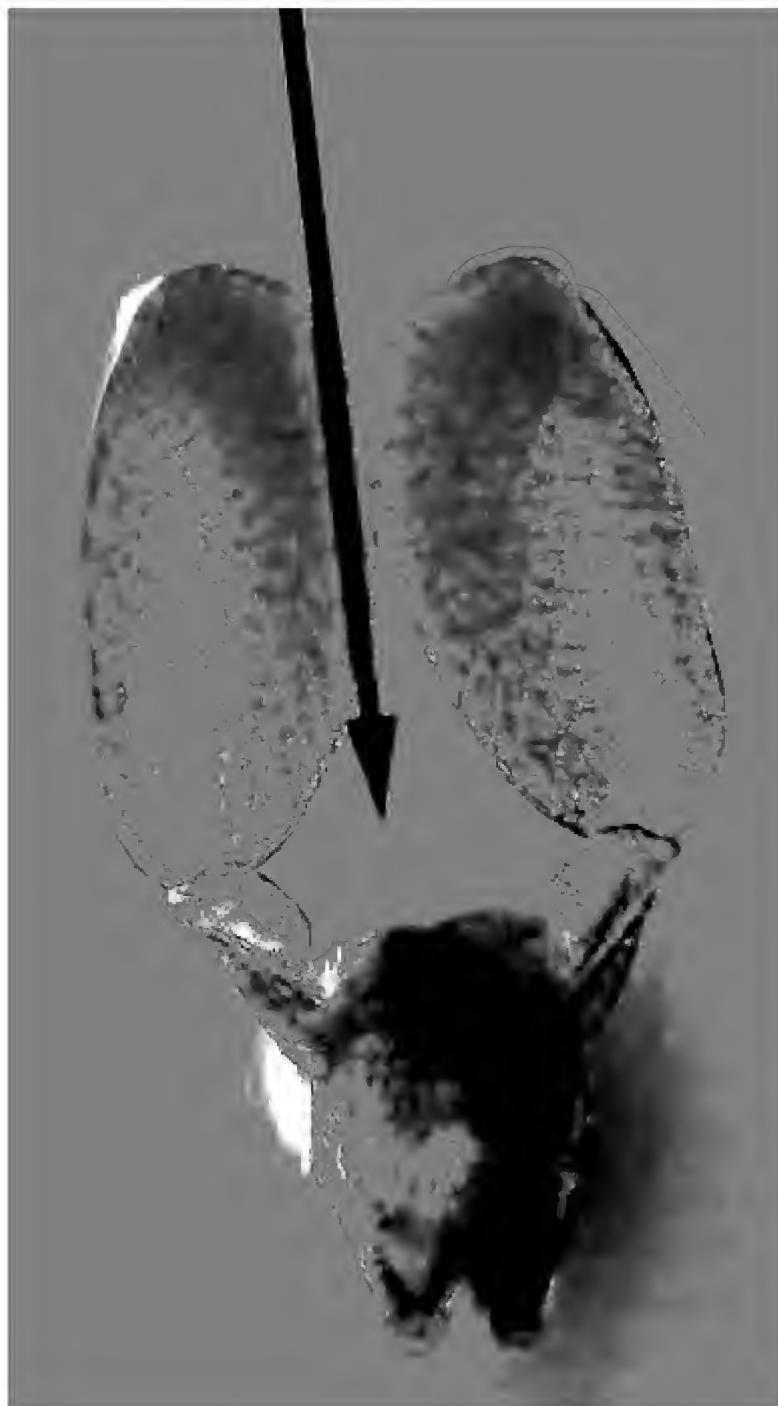
Translator/caudicle Type: lb/cw

Pollinia types 2018-7

ls/r or l/r

1. **Hoya mindorensis subsp. ehirsuta** Kloppenburg & Mendoza
2. **Hoya mindorensis subsp. superba** Kloppenburg 2005
3. **Hoya mindorensis subsp. cremea** Kloppenburg & Mendoza
4. **Hoya mindorensis subsp. recurvula** Kloppenburg
5. **Hoya mindorensis subsp. horizontala** Kloppenburg, Guevarra & Carandang
6. **Hoya mindorensis subsp. kanagongensis** Kloppenburg & Mendoza
7. **Hoya mindorensis subsp. altransa** Kloppenburg, Guevarra & Carandang
8. **Hoya mindorensis subsp. waymaniana** Kloppenburg
9. **Hoya mindorensis subsp. duoa** Kloppenburg, Guevarra & Carandang
10. **Hoya erythrostemma** Kerr 1939
11. **Hoya mindorensis subsp. quezonensis** Kloppenburg & Mendoza
12. **Hoya mindorensis subsp. globosa** Kloppenburg, Guevarra & Carandang
13. **Hoya mindorensis subsp. tingkoyanensis** Kloppenburg & Mendoza GM #119
14. **Hoya mindorensis subsp. luzonensis** Kloppenburg & Mendoza
15. **Hoya mindorensis subsp. squama** Kloppenburg, Guevarra & Carandang
16. **Hoya mindorensis subsp. gelba** Kloppenburg & Mendoza
17. **Hoya mindorensis subsp. nagcarlanensis** Kloppenburg & Mendoza
18. **Hoya mindorensis subsp. lalawinanensis** Kloppenburg & Mendoza
19. **Hoya sp. W 9456** Savai'i
20. **Hoya mindorensis subsp. lagunaensis** Kloppenburg & Mendoza
21. **Hoya mindorensis subsp. nuevaensis** Kloppenburg & Mendoza
22. **Hoya mindorensis** Schlechter 1906
23. **Hoya mindorensis subsp. rosea** Kloppenburg & Mendoza
24. **Hoya mindorensis subsp. tacta** Kloppenburg, Guevarra & Carandang
25. **Hoya mindorensis subsp. mendozae** Kloppenburg & Ferreras 2015
26. **Hoya mindorensis subsp. condupla** Kloppenburg, Guevarra & Carandang
27. **Hoya mindorensis subsp. hirsuta** Kloppenburg, Gueverra & Carandang
28. **Hoya mindorensis subsp. bakerensis** Kloppenburg & Mendoza
29. **Hoya mindorensis subsp. ligulasepala** Kloppenburg & Mendoza
30. **Hoya mindorensis subsp. mabilogensis** Kloppenburg & Mendoza
31. **Hoya mindorensis subsp. siniloanensis** Kloppenburg & Mendoza
32. **Hoya mindorensis subsp. granulata** Kloppenburg, Guevarra & Carandang
33. **Hoya mindorensis subsp. corollastriata** Kloppenburg, Mendoza & Cajano
34. **Hoya blashernaezii subsp. straminea** Kloppenburg & Mendoza

Hoya mindorensis subsp. *ehirsuta* Kloppenburg & Mendoza
(unpublished) GM #197



Pollinaria enlarged ca.
165x

Pollinium

length	0.87 mm
widest	0.28 mm

Retinaculum

length	0.23 mm
widest	0.27 mm
ext.	0.15 mm

Translator

length	0.20 mm
widest	0.04 mm

Caudicle

oval	0.15 x 0.06 mm
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Translator caudicle type:
ls/r

Pollinia apex type: R

Caudicle bulb: granulate
G

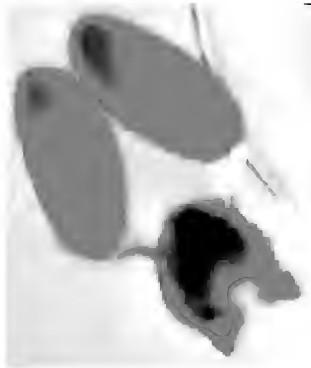
Retinacula character:
HH/LN

With most of the subspecies in this group the legs of the retinaculum are rolled under the lower edge so difficult to delineate. Most have rounded heads but with 2 protrusions further back so

often hidden here both legs and dorsal modifications show. Here the caudicles show the granular surface (much like a dried snake skin). The supporting translators are dark with convex dorsal surfaces.

***Hoya mindorensis* subsp. *superba* Kloppenburg 2005**

- Pollinarium enlarge about 65x.



Pollinia

length	0.68 mm
widest	0.30 mm

Retinaculum

nearly round	0.40 mm long
widest	0.44 mm
extensions	0.16 mm

Translators

length	0.18 mm
width	0.02 mm

Caudicle

bulb diam.	0.09 mm
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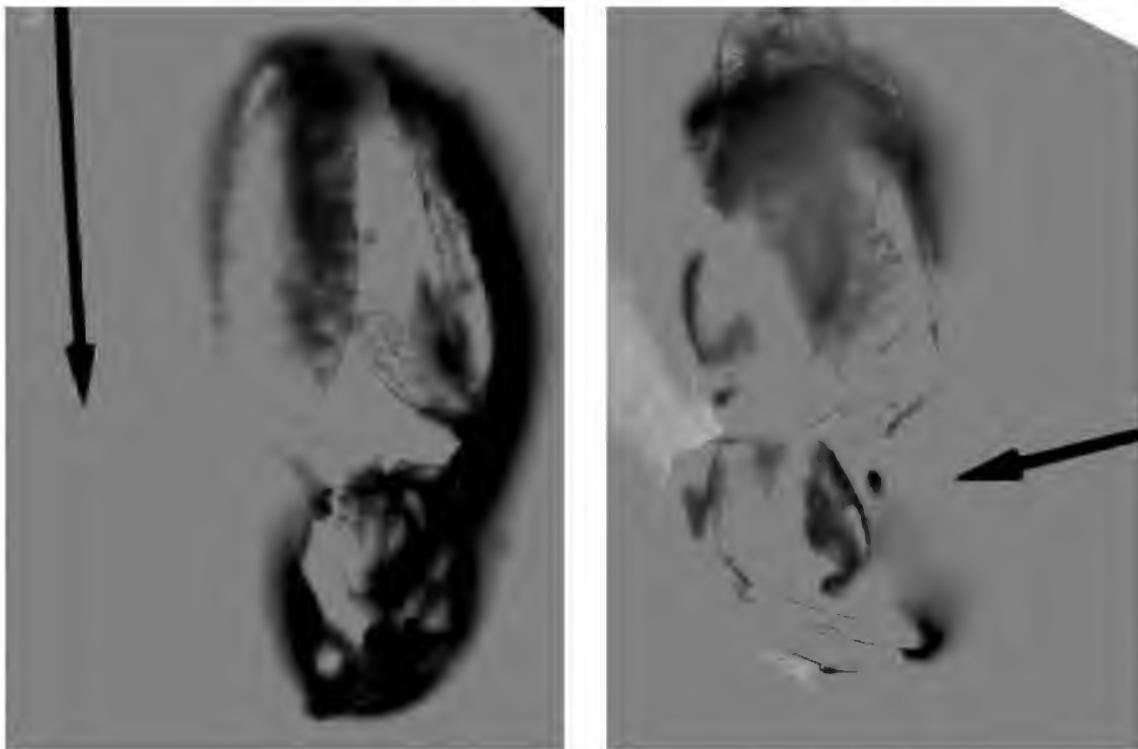
Photo to left is enlarged area of the translators and clear caudicle bulb attached from the dark round retinacula to the pollinium.

Translator/caudicle type: l/r

Pollinia inner end type: R

Caudicle bulb: G finely

Retinacula character: LN



photos above of the pollinarium, both enlarged about 90x, neither very focused. The mindorensis group have a very deceptive retinacular structure that normally appears as oval or whit a blocky head, the long extensions, that normally in most hoyas species extend over the stylar table edge and contact the stigmatic surface below. Here they curl under the bulk of the retinaculum and in most views are hidden, the right photo here clearly shows how really relatively long they actually are and their narrow shape.

Pollinium

length	0.60 mm
widest	0.30 mm

Translator/caudicle type: ls/r

Retinaculum

length	0.35 mm
widest	0.30 mm
ext.	0.38 mm

Pollinia inner end type: R

Translator

length	0.10 mm
widest	0.04 mm

Caudicle

bulb	0.11 mm
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Hoya mindorensis subsp. *horizontalis* Kloppenburg



Pollinarium enlarged
140x.

Pollinium

length 0.60 mm
widest 0.25 mm

Retinaculum

Oval 0.35 x 30 mm
Here as with most of the subspecies the extensions are relatively long and are curved under the lower edge of the retinaculum.

Translator:

length 0.10 mm
wide 0.01 mm

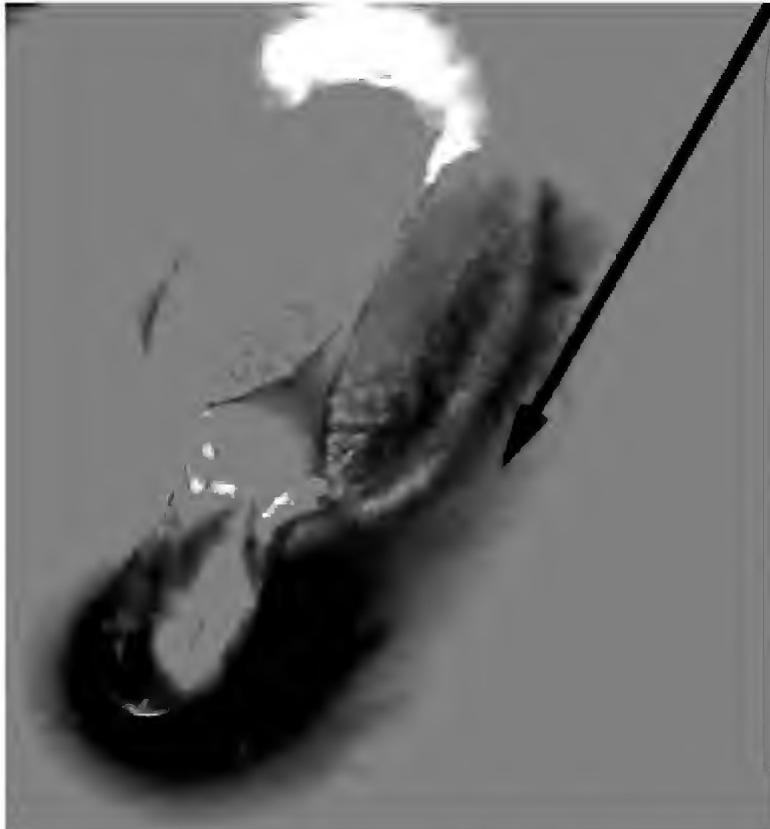
Caudicle:

bulb diam. 0.10 x 0.05 mm

Translator/caudicle type:
ls/r

Pollinia end type: R

***Hoya mindorensis* subsp. *cremea* Kloppenburg & Mendoza
(unpublished) GM #107**



Pollinarium enlarged ca.
120x.

Pollinium

length	0.60 mm
widest	0.25 mm

Retinaculum

length	0.34 mm
widest	0.25 mm
ext.	0.05 mm

Translator

length	0.24 mm
wide	0.01 mm

Caudicle

end	0.05 mm
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Translator/caudicle type:
ls/r

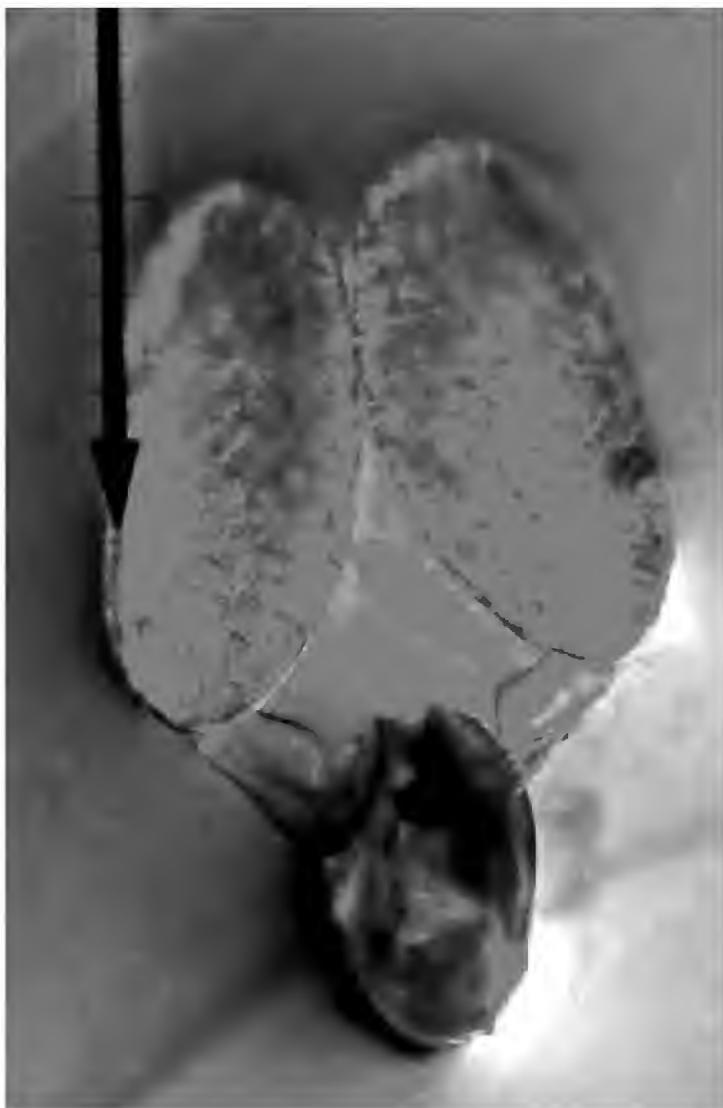
Pollinia end type: R

Caudicle bulb: C

Retinacula character: LH

There are extensions to the retinaculum, they are curved under forming a rounded apex.

***Hoya mindorensis* subsp. *kanagongensis* Kloppenburg & Mendoza
(unpublished) GM #**



Pollinarium enlarged 120x.

Pollinium

length	0.59 mm
widest	0.30 mm

Retinaculum

length	0.35 mm
widest	0.25 mm

Translator

length	0.17 mm
widest	0.05 mm

Caudicle

0.15 x 0.07 mm
rectangular

Translator/caudicle type: ls/r

Pollinia apex type: RT

Caudicle bulb: G finely

Retinacula character: LH/
HH

***Hoya mindorensis* subsp. *altransa* Kloppenburg, Guevarra & Carandang
(unpublished) BG #3**



Pollinarium
enlarged 150x.

Pollinium

length	0.57 mm
widest	0.27 mm

Retinaculum

length	0.39 mm
widest	0.25 mm
ext.	0.12 mm

Translator

length	0.17 mm
wide	0.02 mm

Caudicle

bulb 0.17 x 0.07 mm

Translator/caudicle type:
ls/r

Pollinium ends: R

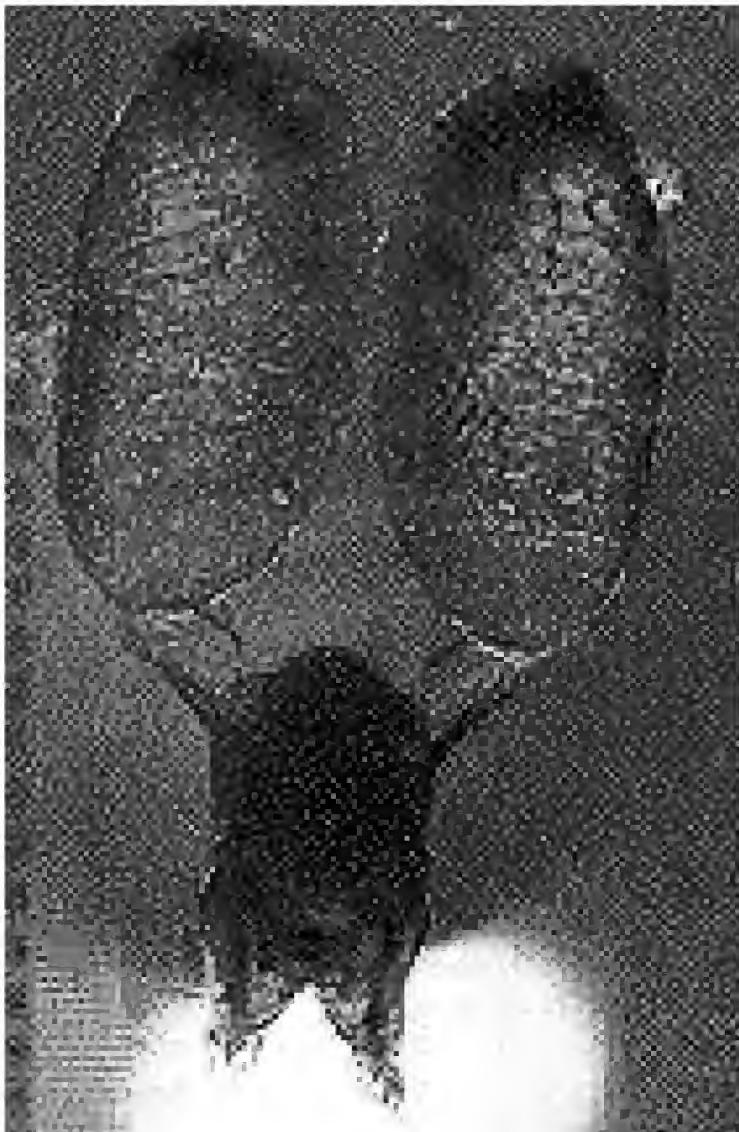
Caudicle bulb: G scaly

Retinacula character: LH

The measurements of the retinaculum length is from the head (inner apex) to the crotch where the legs begin. In most mindorensis variants the extensions are curved under the ovate

outer (lower) end of the retinaculum and as here are relatively long. The caudicle surface here is covered with scale like surface.

***Hoya mindorensis* subsp. *waymaniana* Kloppenburg**
(unpublished)



Caudicle bulb: G scaly

Retinacula character: LN

Pollinarium enlarged about 165x. Note the squeezed sides of the retinaculum referred to by Schlechter, the narrow (linear) translator arms and the clear caudicles. The pollinia are ovate and the pellucid edge is almost imbedded in the fatness of the pollinia.

Pollinium:

length	0.57 mm
widest	0.27 mm

Retinaculum:

length	0.34 mm
head shoulder and waist	
the same width	0.20 mm
hip	0.23 mm
extensions	0.12 mm

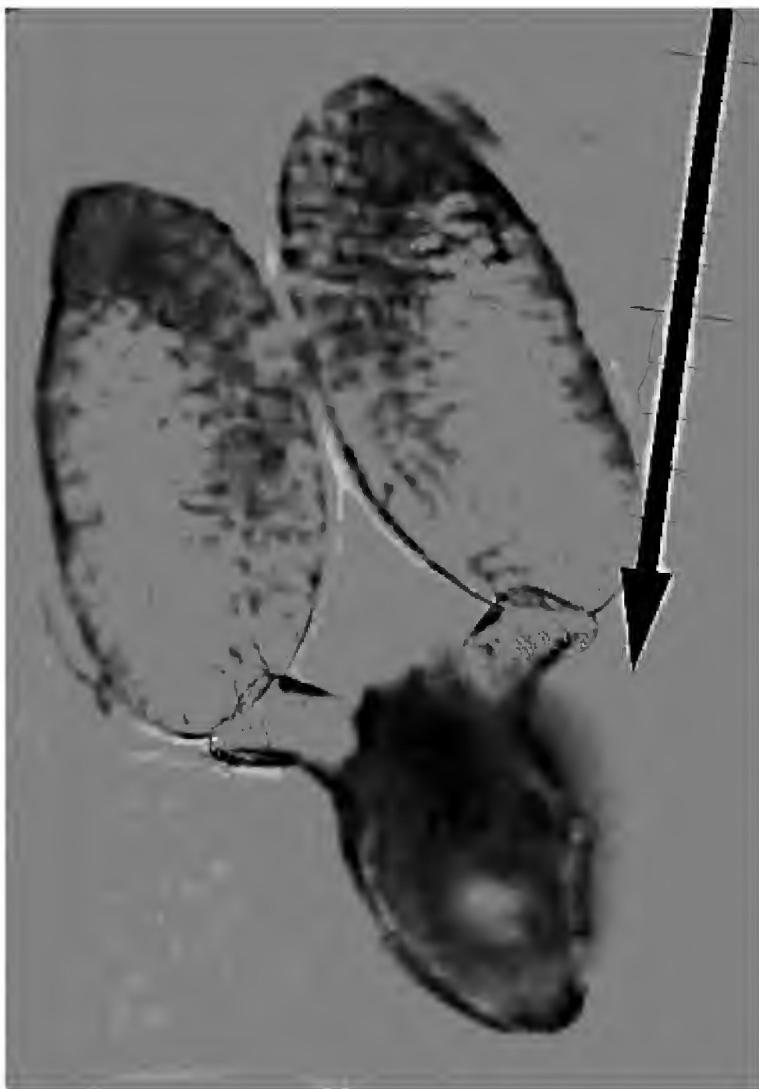
Translators

narrow	0.15 mm
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Caudicles also narrow, bulb 0.06 wide.

Pollinium ends: R

Hoya mindorensis subsp. duoia Kloppenburg, Guevarra &
Carandang
(unpublished) BG #2



Pollinarium:
enlarged ca. 150x.

Pollinium
length 0.57 mm
widest 0.20 mm

Retinaculum
length 0.20 mm
widest 0.21 mm
ext. 0.05 mm

Translator
length 0.15 mm
widest 0.02 mm

Caudicle
bulb 0.16 x 0.05 mm

Translator/caudicle type:
ls/rectangle

Pollinia end type: R

Caudicles are scaly surfaced.

Retinacula character: LH

Legs (ext.) of retinaculum not seen in this photo are extended and touch at outer extension to form a somewhat cup like depression between them..

Hoya erythrostemma Kerr 1939

Flower via MM



Pollinarium
enlarged about 165x

Translator/caudicle
type: l/r

Pollinia apex type:
R

Caudicle bulb: G

Retinacula
character: LH

Pollinium

length	0.57 mm
widest	0.23 mm

Retinaculum

length	0.30 mm
shoulder	0.22 mm
waist	0.14 mm
hip	0.17 mm extensions little or none ?

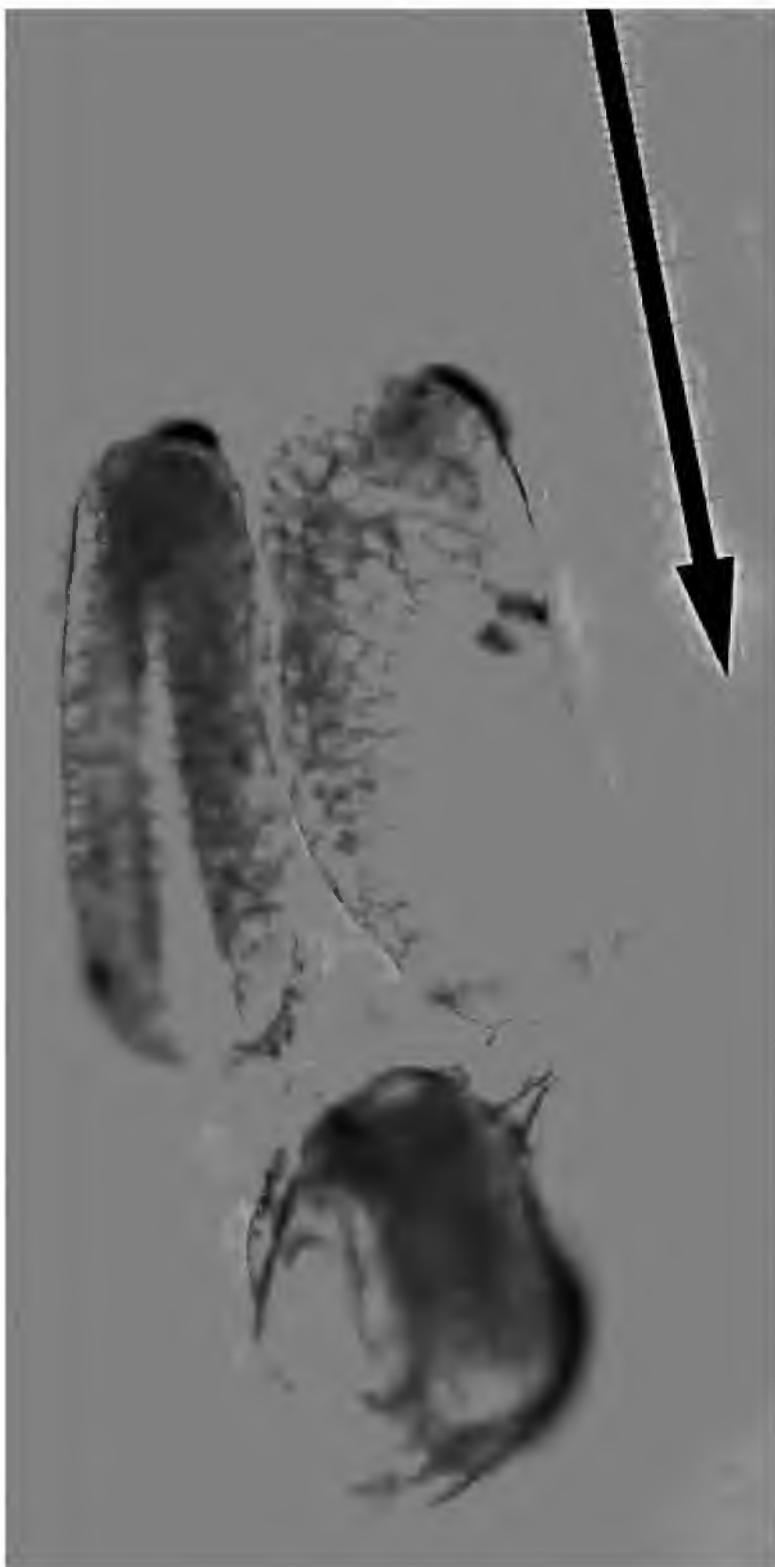
Translators

length	0.19 mm
depth	0.02 mm

Caudicle

bulb diam.	0.08 mm
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***Hoya mindorensis* subsp. *quezonensis* Kloppenburg & Mendoza
(unpublished) GM #161**



Pollinarium enlarged 150x.

Pollinium

length	0.57 mm
widest	0.26 mm

Retinaculum

length	0.33 mm
widest	0.28 mm
ext.	0.13 mm

extensions curve under the
retinacular body

Translator

length	0.07 mm
widest	0.03 mm

Caudicle

oval 0.10 x 0.05 mm

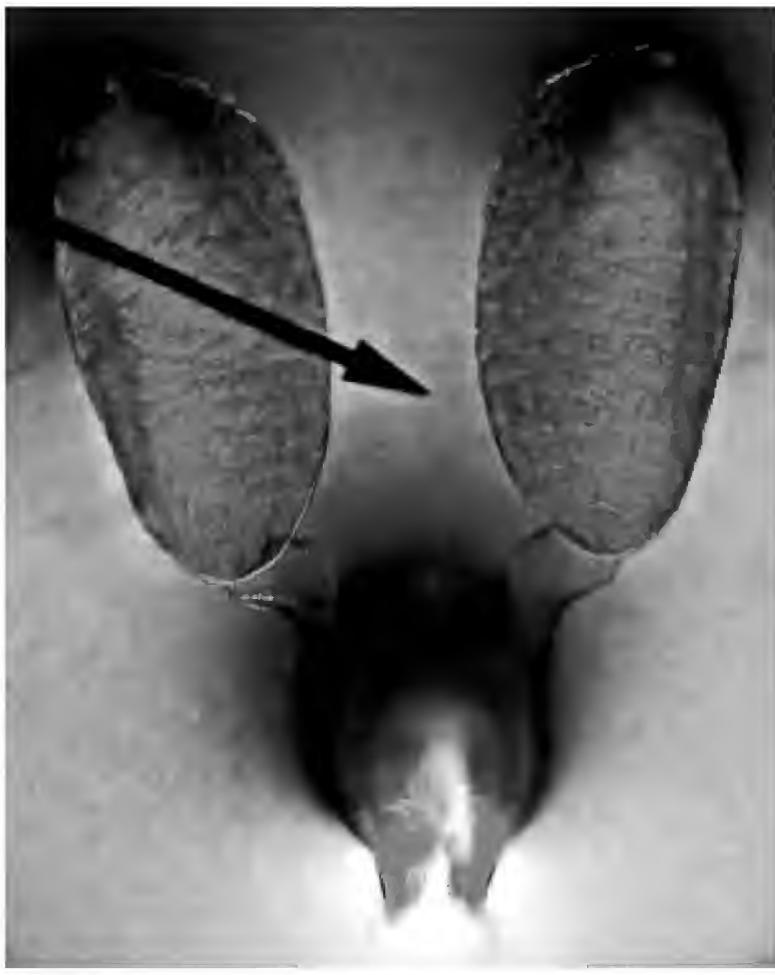
Translator/caudicle type:
ls/r

Pollinia apex type: R

Retinacula type: LH

Caudicle: G finely

***Hoya mindorensis* subsp. *globosa* Kloppenburg, Guevarra & Carandang
(unpublished) BG #13**



Pollinaria enlarged 112x

Pollinium

length	0.56 mm
widest	0.30 mm

Retinaculum

length	0.31 mm
widest	0.30 mm
ext.	0.08 mm

Translator

length	0.10 mm
widest	0.03 mm

Caudicle

bulb 0.11 x 0.06 mm
bulb surface is granulate.

Translator/caudicle type:
ls/r

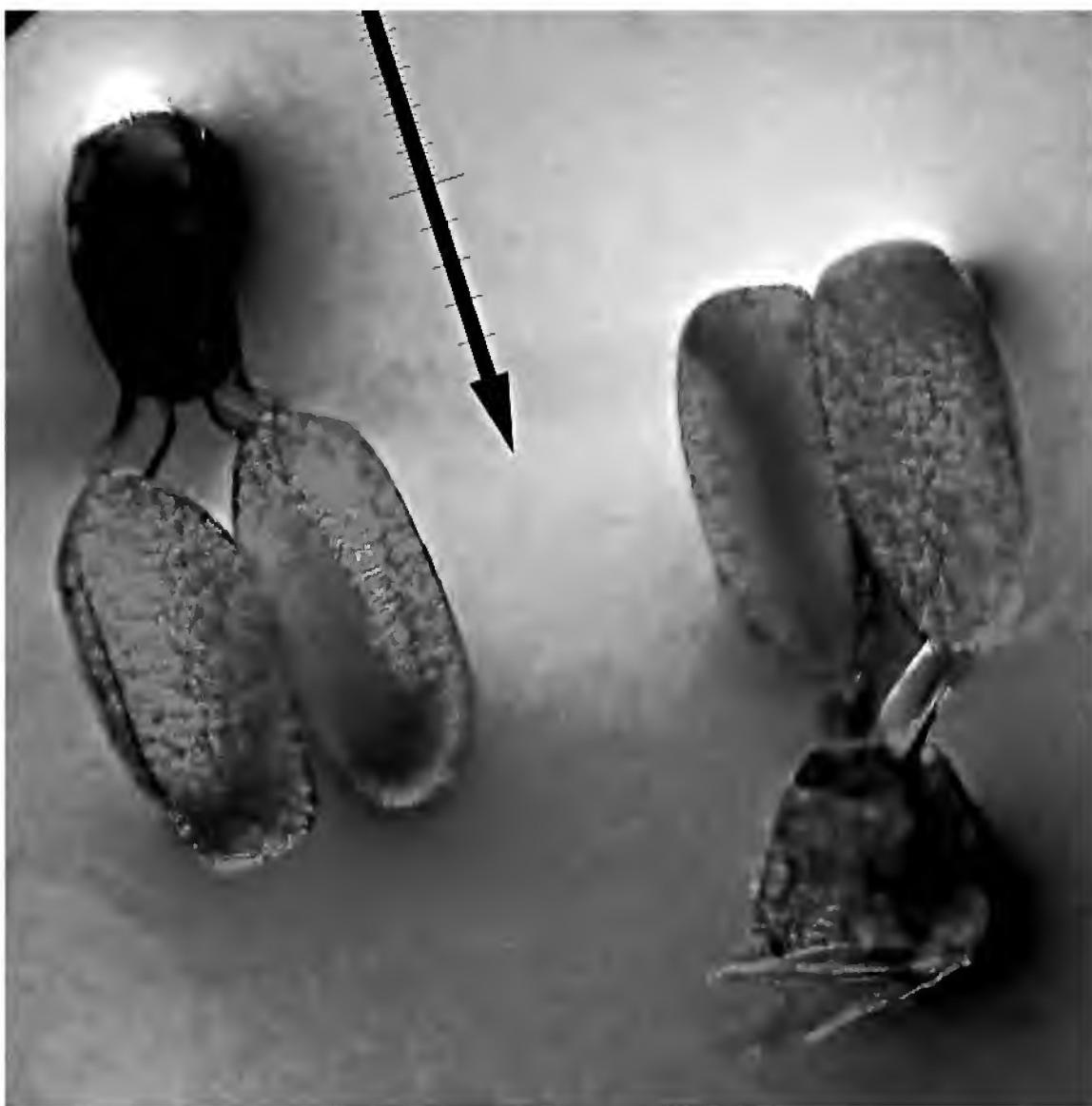
Pollinia inner apex type:
R

Caudicle bulb: finely granulate G

Retinacula character: LN

Observations: in many of these mindorensis subspecies the retinaculum is ovate and the extensions are turned under the base at least when extracted, a few like this subspecies have definite extensions "legs" that are clearly visible at extraction. Even fewer have rather blocky extensions. The translators are larger as they approach to retinaculum sides. Pollinia grains are her well defined.

***Hoya mindorensis* subsp. *tingkoyanensis* Kloppenburg &
Mendoza (unpublished) GM #119**



Pollinaria above enlarged ca. 110x. Note the pellucid edge on the left Pollinia picture above normally hidden and not easily discerned in this complex.

Pollinium

length	0.56 mm
widest	0.27 mm

Caudicle

bulb is oval 0.16 mm x 0.10 mm

Retinaculum in ovoid the picture on the right has 2 spurs at it's bottom (extensions).

left length	0.45 mm	0.30 mm widest
right length	0.35 mm	0.40 mm widest ext. 0.40 mm

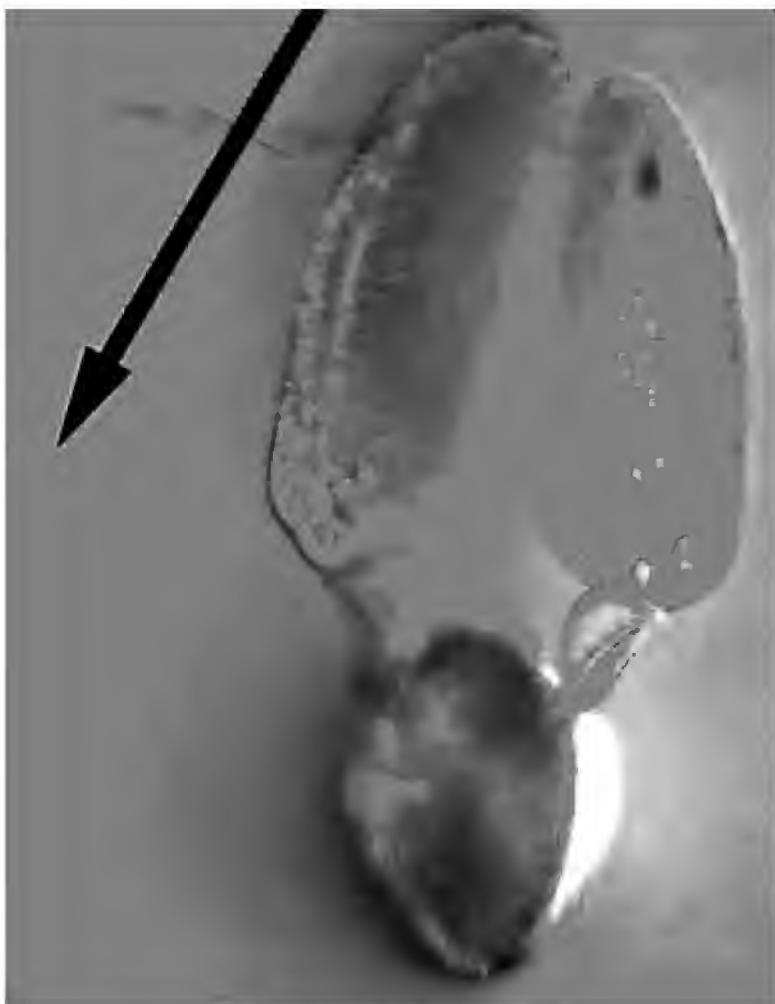
Translators appear (rt.) to arise from the top of the retinaculum

length	0.20 mm
widest	0.02 mm

Translator/caudicle type: ls/r **Pollinia apex type:** R **Caudicle bulb:** G

Retinacula character: LN

***Hoya mindorensis* subsp. *luzonensis* Kloppenburg & Mendoza
(unpublished) GM #196**



Pollinium enlarged 130x

Pollinium

length 0.55 mm
widest 0.30 mm

Retinaculum

length 0.32 mm
widest 0.22 mm

Translator

length 0.15 mm
widest 0.04 mm

Caudicle

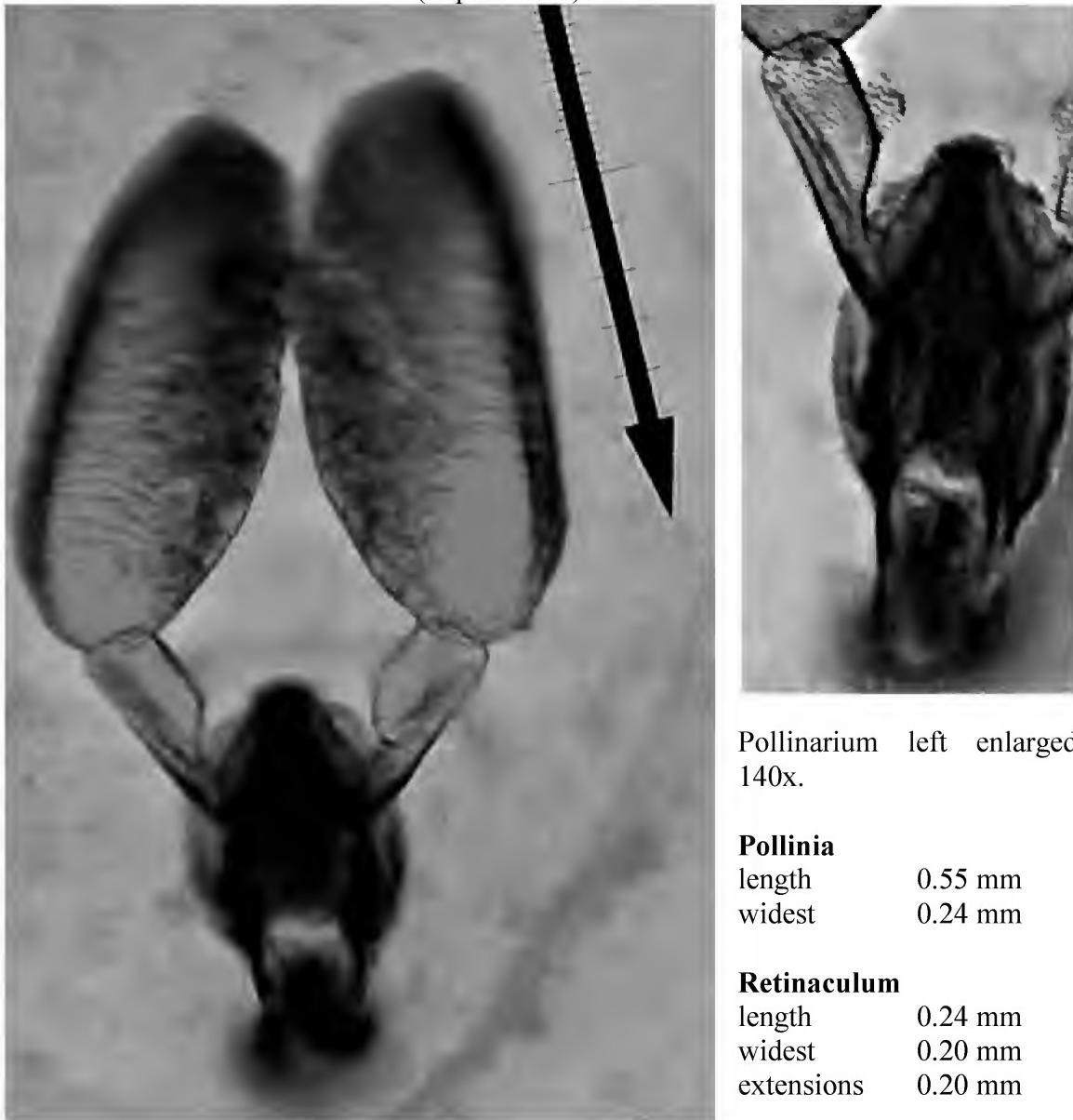
oval 0.10 x 0.05 mm
ls/r

Pollinia apex type: R

Caudicle bulb: G

Retinacula character: LH

***Hoya mindorensis* subsp. *squama* Kloppenburg, Guevarra & Carandang
(unpublished) BG #7**



Pollinaria left enlarged
140x.

Pollinia

length	0.55 mm
widest	0.24 mm

Retinaculum

length	0.24 mm
widest	0.20 mm
extensions	0.20 mm

Caudicle

bulb 0.15 X 0.05 mm

Type: G

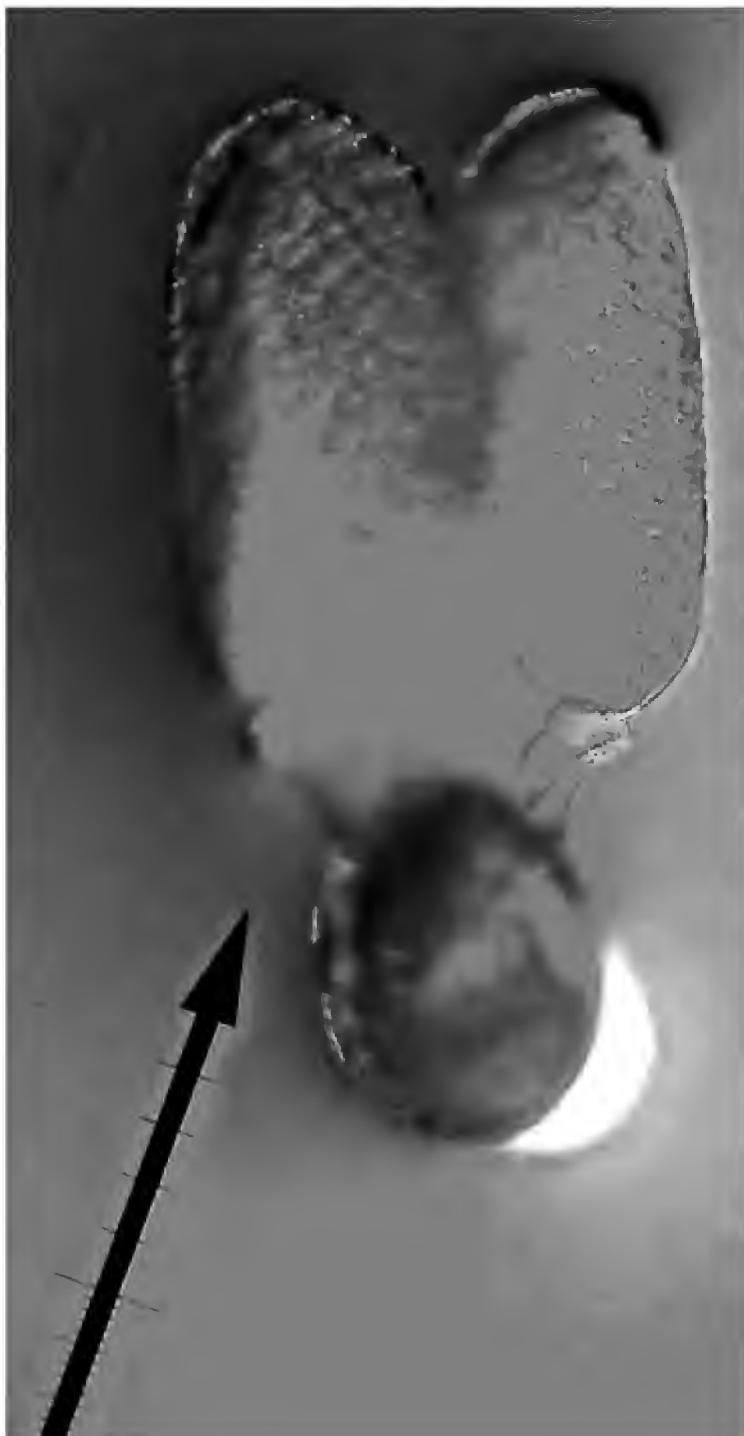
Pollinia ends: R

Translator/caudicle type: ls/r rectangle

Retinacula character: LN

The measurements of the retinaculum length is from the hear (inner apex) to the crotch where the legs begin. In most mindorensis variants the extensions are curved under the ovate outer (lower) end of the retinaculum and as here are relatively long. The caudicle surface here is covered with scale like surface.

***Hoya mindorensis* subsp. *gelba* Kloppenburg & Mendoza**
(unpublished) GM #178



Pollinaria enlarged ca.
180x.

Pollinium
length 0.54 mm
widest 0.29 mm

Retinaculum
length 0.22 mm
widest 0.29 mm

Translator
length 0.13 mm
widest 0.04 mm

Caudicle
oval 0.13 x 0.05 mm

Translator/ caudicle type:
ls/r

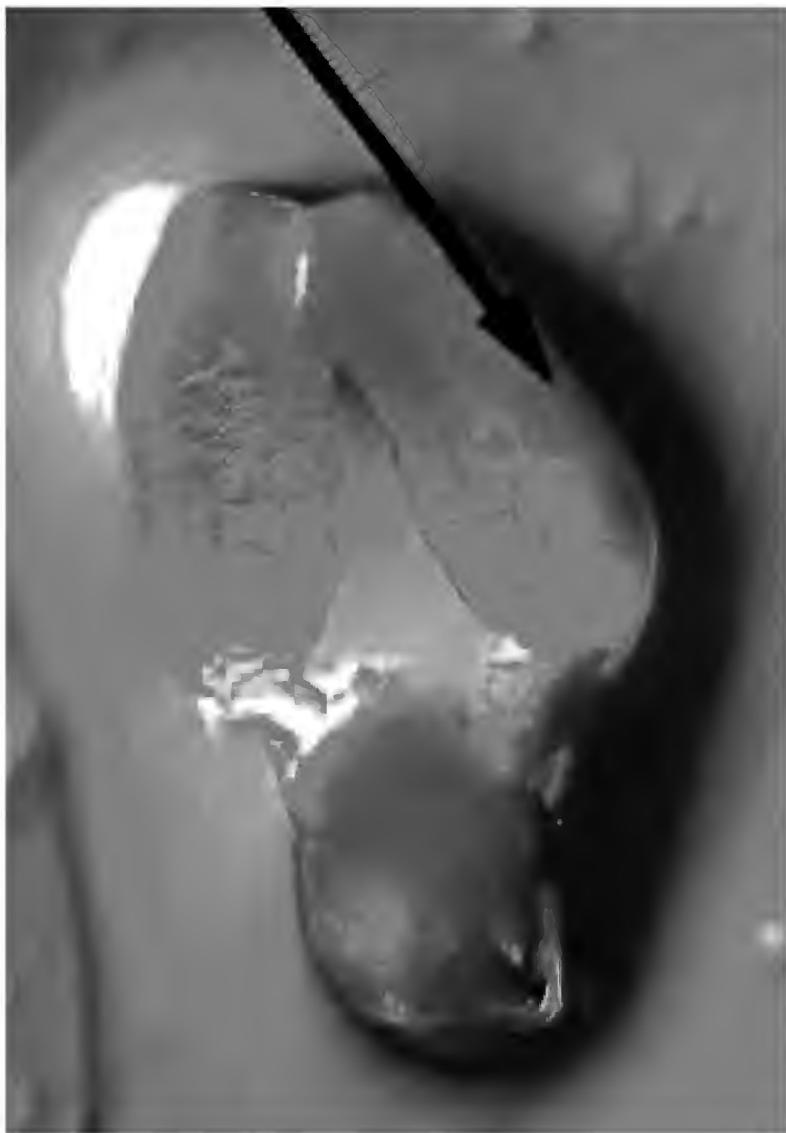
Pollinia apex type: R

Caudicle bulb: G

Retinacula character: LH

The retinaculum is essentially round with the extensions at the bottom rolled under so nearly indistinguishable. The caudicle surfaces are granulate. Pollen grains in the pollinia are well defined.

***Hoya mindorensis* subsp. *nagcarlanensis* Kloppenburg & Mendoza
(unpublished) GM #79**



Pollinaria enlarged ca.
120x

Pollinium

length	0.54 mm
widest	0.22 mm

Retinaculum

length	0.30 mm
widest	0.21 mm
ext.	0.05 mm

Translator

length	0.15 mm
widest	0.04 mm

Caudicle

bulb diam.	0.07 mm
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**Translator/caudicle
type:** ls/r

Pollinia end type: R

Caudicle bulb: G

Retinacula character:
LN

***Hoya mindorensis* subsp. *lalawinanensis* Kloppenburg & Mendoza
(unpublished) GM #175**



Pollinaria enlarged 90x.

Pollinium

length	0.53 mm
widest	0.29 mm

Retinaculum

length	0.26 mm
widest	0.20 mm
ext.	0.03 mm

Translator

length	0.15 mm
wide	0.02 mm

Caudicle

oval	0.12 x 0.05 mm
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Translator/caudicle type:
ls/r

Pollinia apex type: R

Caudicle bulb: ?

Retinacula character: HH

W 9456 Savai'i



Pollinia

length	0.54 mm
widest	0.21 mm

Retinaculum

length	0.18 mm
shoulders	0.12 mm
waist	0.06 mm
hip	0.10 mm
extensions	0.03 mm

Retinacula type: S

Pollinia inner ends: RT

Translator/caudicle type: ls/r

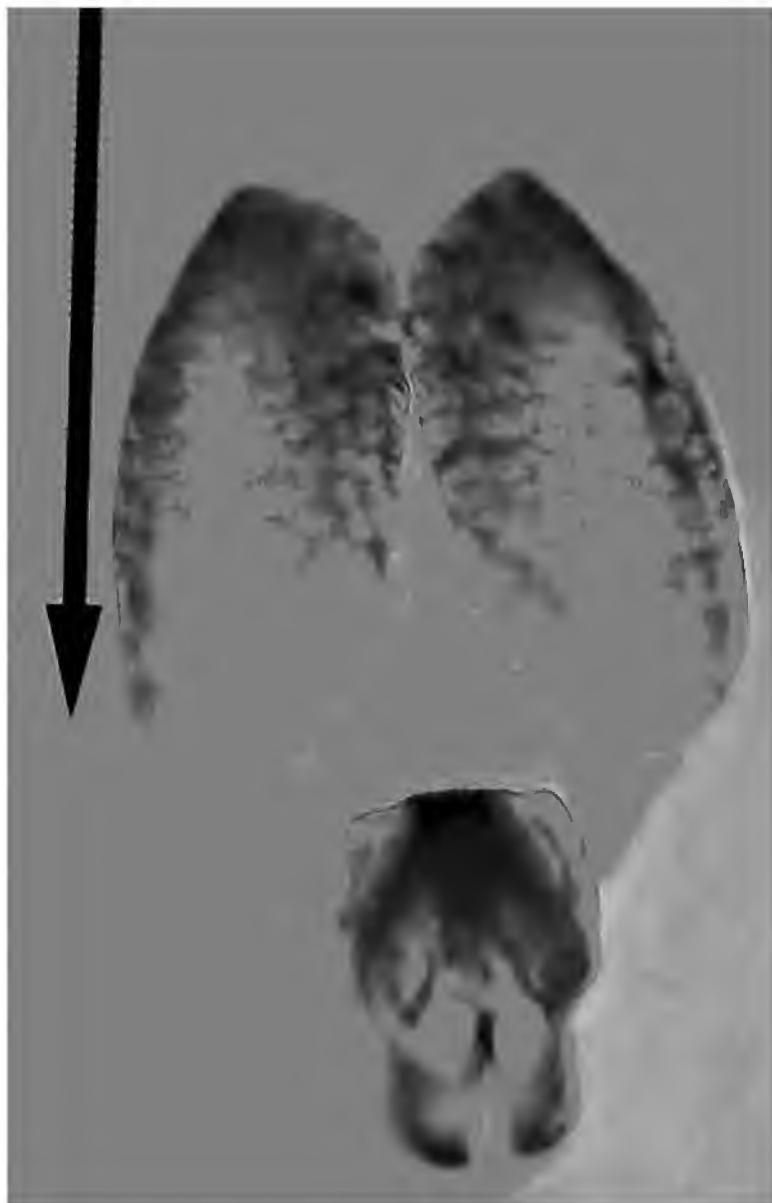
Caudicle bulb: C



present. Some pollen grains have germinated.

A better view of the retinaculum enlarged as above. Translators are short and wider near the retinaculum only part of the clear caudicle on top is visible here, may have stayed on the pollinium end. Same retinaculum will yield some structural differences due to depth of focus as this is a 3 dimensional object. Note here the shoulders seem to turn up and as they go back at a lower level, they turn down. Pollinia has a clear pellucid edge from top to near the inner end and accompanied by the void area with no pollen structures

***Hoya mindorensis* subsp. *lagunaensis* Kloppenburg & Mendoza
(unpublished) GM #177**



Pollinaria enlarged 140x.

Pollinium

length	0.52 mm
widest	0.26 mm

Retinaculum

length	0.25 mm
widest	0.24 mm
extensions	0.07 mm
legs	0.18 mm

Translator

length	0.18 mm
widest	0.03 mm

Caudicle

Oval shaped 0.10 x 0.05 mm

The retinaculum has a broad head, no shoulder, waist or hip as present with the majority of hoyo species. Te extensions are also different with wide sides and blunt outer apex. Above the crotch they seem to extend like legs which measure 0.18 cm long.

Translator/caudicle type: ls/r, caudicles with a fine granular surface, not clear.

Pollinia apex type: RT

Caudicle bulb: G

Retinacula character: LN

The pollinia has distinct pollen structures.

***Hoya mindorensis* subsp. *nuevaensis* Kloppenburg & Mendoza
(unpublished) GM #194**



Pollinarium
enlarged 120x.

Pollinium

length	0.52 mm
widest	0.17 mm

Retinaculum

length	0.35 mm
widest	0.25 mm

Translators

length	0.16 mm
widest	0.02 mm

Caudicle

rectangle 0.10 x 0.05 mm

Translator/caudicle type:
ls/r

Pollinia apex type: R

Caudicle bulb: G

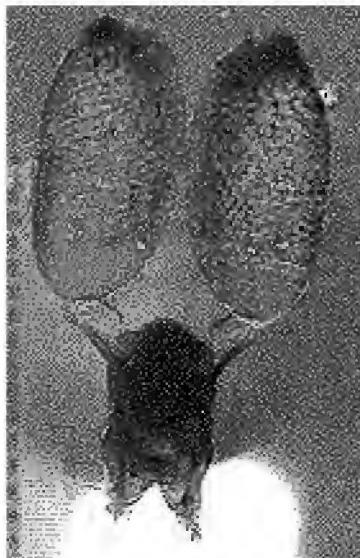
Retinacula character: LN

I have decided to add a new classification for the *Hoya mindorensis* caudicles since they are not oval "o" nor funnel shaped "cw" so the new classification will be rectangular "r".

Here the caudicles have a concave dorsal and rounder outer end and cut off (straight) inner edge. The surface is finely granulate. The pollinia is well defined within the pollinium.

Hoya mindorensis Schlechter 1906

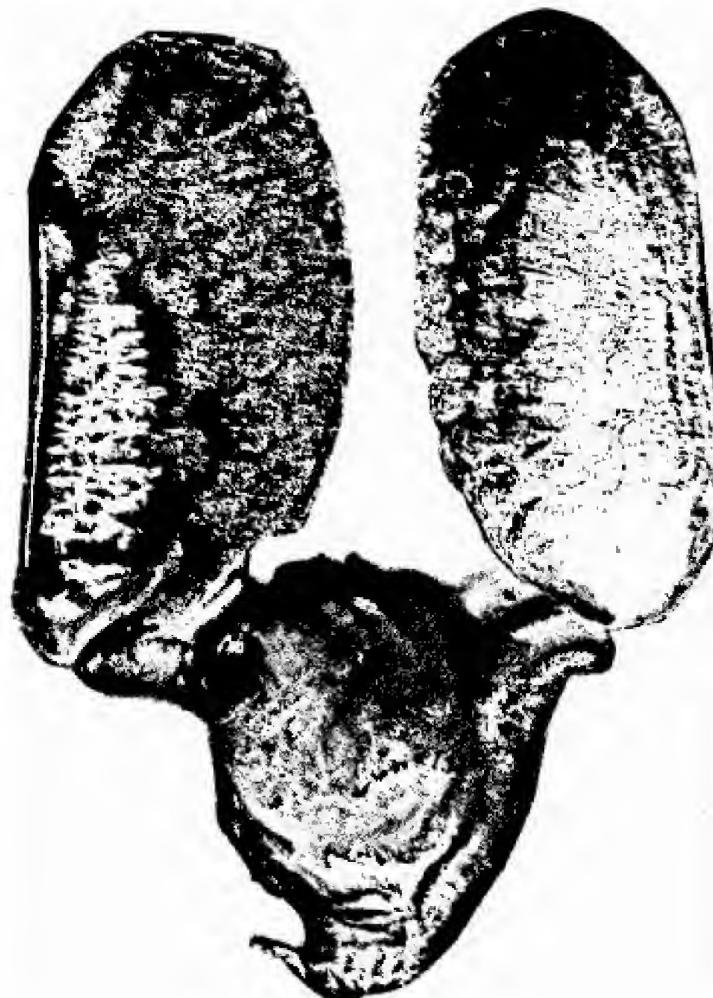
Clone 890508 flowers sent by Ann Wayman.



Pollinarium enlarged about 65x.

Note the squeezed sides of the retinaculum referred to by Schlechter, the narrow (linear) translator arms and the clear caudicles. The pollinia are ovate and the pellucid edge is almost imbedded in the fatness of the pollinia.

Flower from Diffin, Querino Prov. Luzon Philippines via Maximo Wayett. About 165x.



Pollinium

length: 0.52 mm
widest: 0.24-.27 mm

Retinaculum

length: 0.30 mm
shoulder: 0.22 mm
waist: 0.17 mm
hip: 0.22 mm
ext.: 0.08 mm ?

Translators

length: 0.15 mm
depth: 0.05 mm

Caudicle

appears to be linear,
ca. 0.05 mm thick.

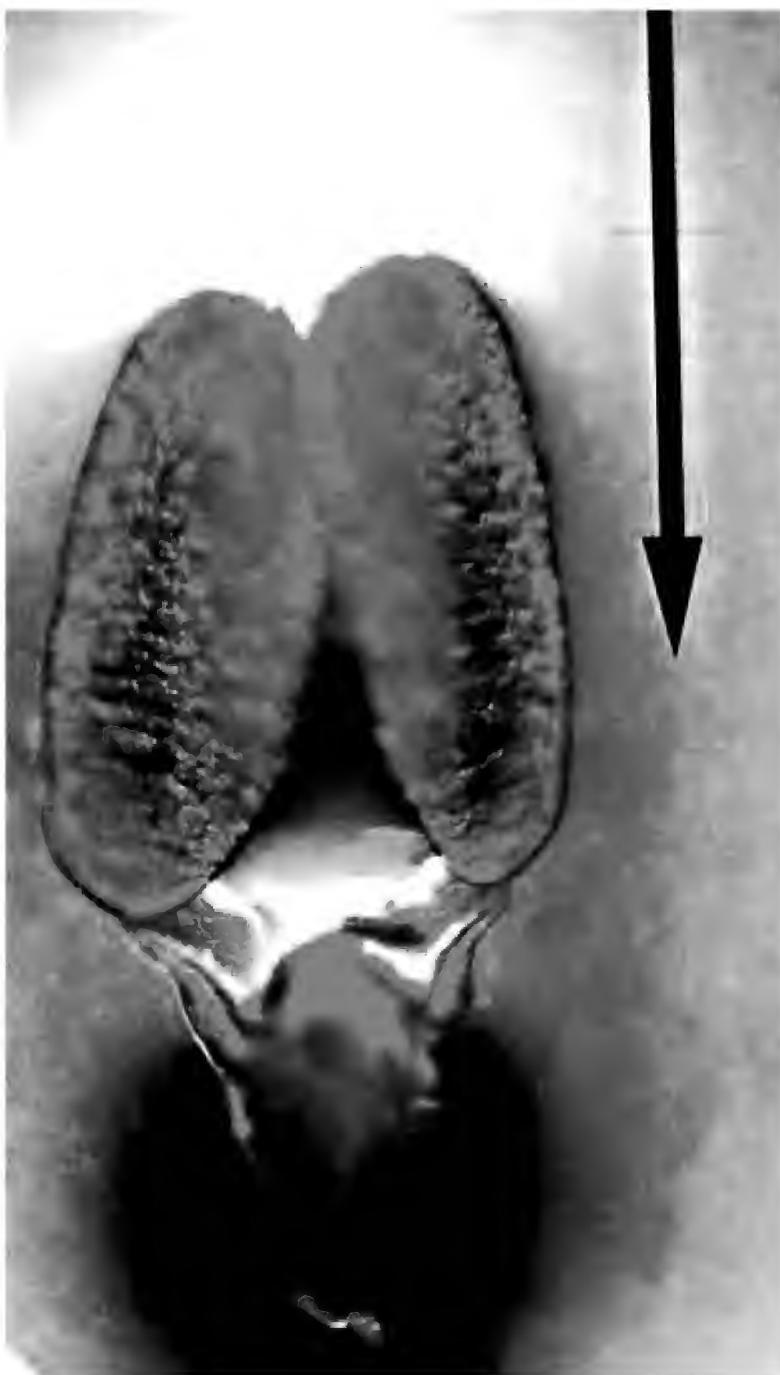
Translator/caudicle type:
ls/r

Pollinia apex type: R

Caudicle bulb: G

Retinacula character: LN

***Hoya mindorensis* subsp. *rosea* Kloppenburg & Mendoza**
(unpublished) GM #121



Pollinaria enlarged ca,
150x.

Pollinium

length	0.51 mm
widest	0.24 mm

Retinaculum

length	0.29 mm
widest	0.20 mm
ext	0.02 mm

Translator

length	0.17 mm
widest	0.04 mm

Caudicle

bulb shape 0.10 x 0.06 mm

Translator/caudicle type:
ls/r

Pollinium end type: R

Caudicle bulb: very finely
granulate

Retinacula character: LH

***Hoya mindorensis* subsp. *tacta* Kloppenburg, Guevarra & Carandang
(unpublished) BG #8**



Pollinaria enlarged 150x.

Pollinium

length 0.51 mm
widest 0.25 mm

Retinaculum

length 0.30 mm
widest 0.20 mm
oval shaped extensions hidden.

Translator

length 0.13 mm
widest 0.03 mm

Caudicle

bulb 0.11 x 0.05 mm

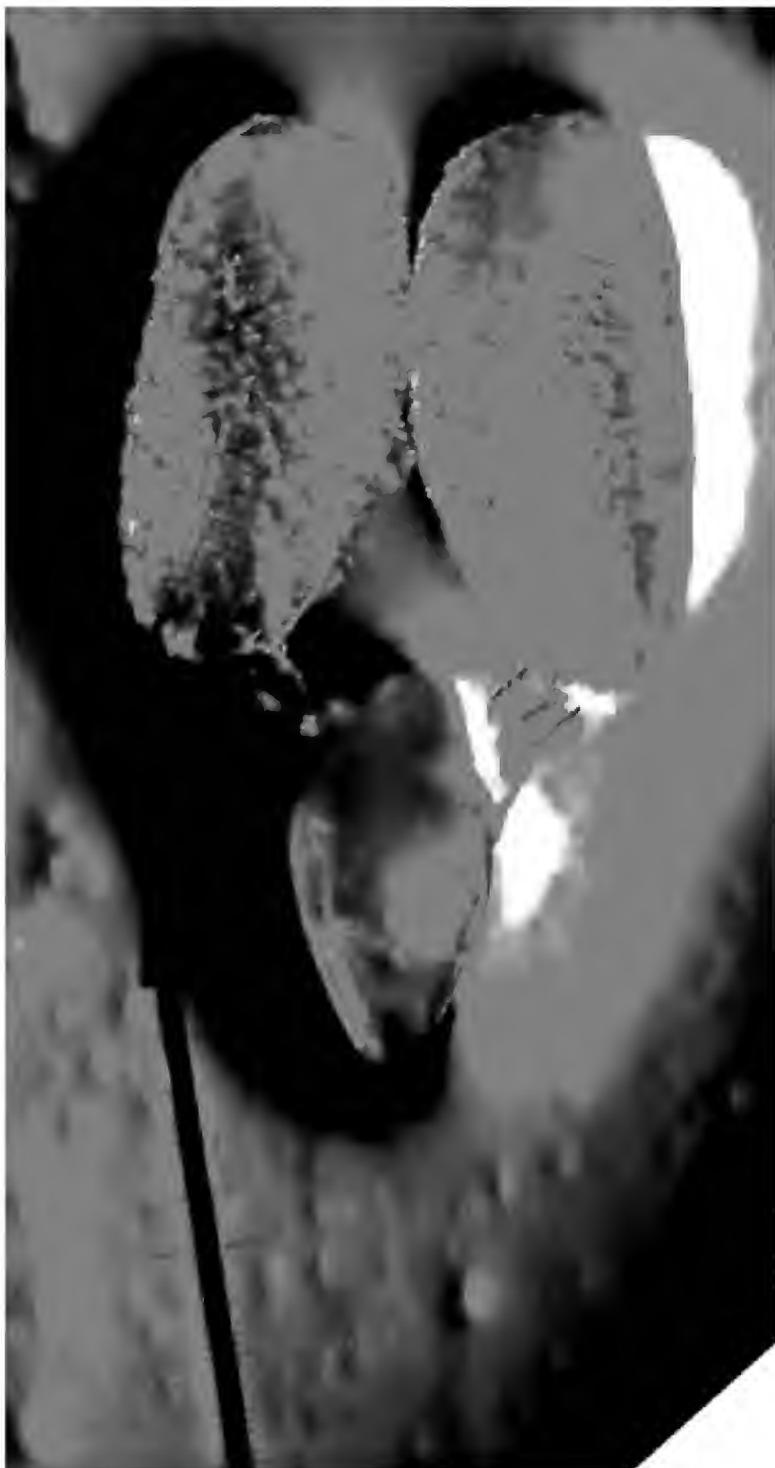
Translator/caudicle type:
ls/r.

Pollinia inner end type: R

Caudicle bulb: G fine

Retinacula character: LH

***Hoya mindorensis* subsp. *mendozae* Kloppenburg & Ferreras 2015**



Pollinaria enlarged ca.
140x

Pollinarium

length	0.50 mm
widest	0.25 mm

Retinaculum

length	0.38 mm
widest	0.19 mm

Translators

length	0.15 mm
depth	0.03 mm

Caudicle

bulb diam.	0.09 mm
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Translator/caudicle Type:
ls/r

Pollinia inner end type: R

Caudicle bulb: G

Retinacula character: LH

Retinacula apex end may
have extensions fused or
tight together here.

***Hoya mindorensis* subsp. *condupla* Kloppenburg, Guevarra & Carandang
(unpublished) BG #6**



Pollinarium here enlarged
140x

Pollinium

length	0.50 mm
widest	0.25 mm

Retinaculum

length	0.24 mm
wide	0.17 mm
ext.	0.10 mm

Translator

length	0.14 mm
wide	0.02 mm

Caudicle

bulb	0.11 x 0.05 mm
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Translator/caudicle Type:
ls/r rectangular

Pollinia end type: R

Caudicle bulb: G finely

Retinacula character: LH

***Hoya mindorensis* subsp. *hirsuta* Kloppenburg, Gueverra & Carandang**
(unpublished) BG #14



projections.

Pollinaria enlarged ca. 130x.

Pollinium

length	0.50 mm
widest	0.24 mm

Retinaculum

length	0.30 mm
widest	0.25 mm
ext.	0.15 mm

Translator

length	0.10 mm
widest	0.02 mm

Caudicle

bulb 0.10 x 0.05 mm

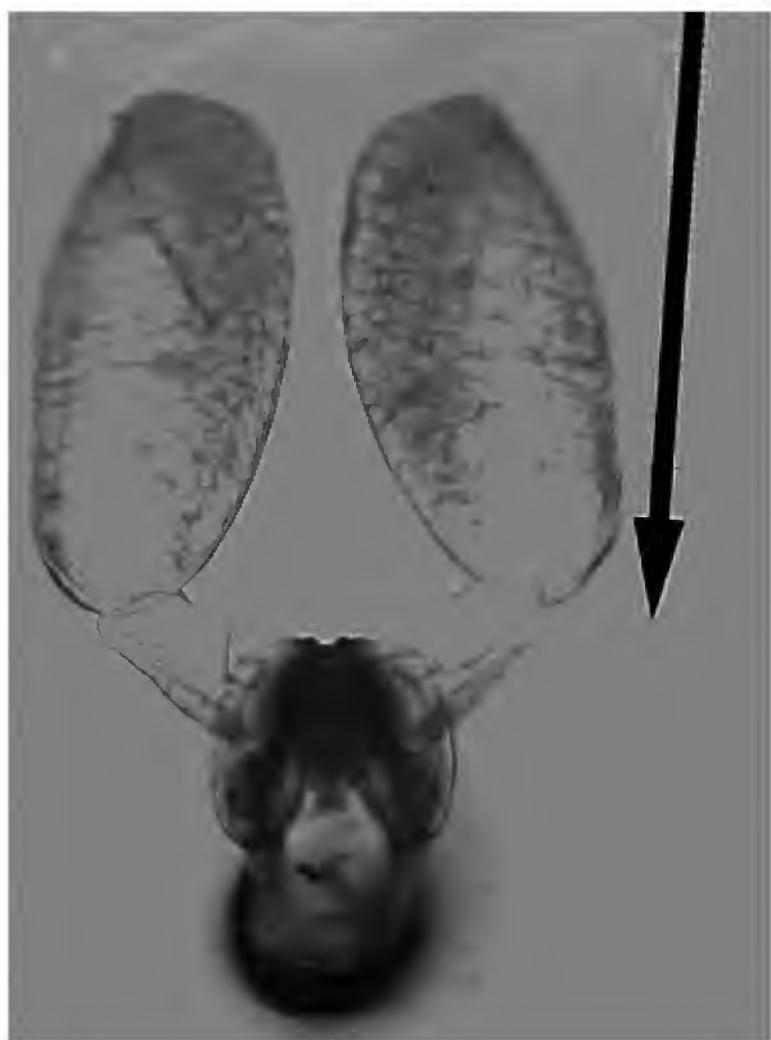
Translator/caudicle type: ls/r

Pollinia inner end Type: R

Retinacula character: LH

Here as in all of these subspecies the retinacular extensions turn under the rounded body in one direction and are semi hidden, this may be due to the twisting of the retinaculum upon extraction, all have head areas that are semi block shaped with dorsal short horn like

***Hoya mindorensis* subsp. *bakerensis* Kloppenburg & Mendoza
(unpublished) GM #186**



Pollinaria enlarged ca
135x.

Pollinium

length	0.50 mm
widest	0.25 mm

Pollinaria

length	0.29 mm
widest	0.18 mm

Translator

length	0.17 mm
widest	0.03 mm

Caudicle

oval	0.13 x 0.07 mm
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Translator/caudicle type:
ls/r

Pollinia apex type: R

Caudicle bulb: fine G

Retinacula character: LN



Pollinaria enlarged ca. 120 x.

Pollinium

length	0.50 mm
widest	0.23 mm

Retinaculum

length	0.29 mm
widest	0.29 mm
ext.	0.05 mm

Translator

length	0.15 mm
widest	0.02 mm

Caudicle Type: G
rectangle 0.10 x 0.05 mm

Translator/caudicle type:
ls/r

Pollinia apex type: R
Retinacula: HH

Here the pollinium is slightly dehydrated so pollinium are shriveled slightly, not fully rounded. The retinaculum has the dorsal (inner) horns as with the majority of this species, the extensions are often folded or wrapped under the bottom of the retinaculum.

***Hoya mindorensis* subsp. *mabilogensis* Kloppenburg & Mendoza
(unpublished) GM #89**



Translator/caudicle type: ls/r

Pollinia inner end type: R

Caudicle bulb: G

Retinacula character: LH

Pollinaria enlarged
ca.130x.

Pollinium
length 0.49 mm
widest 0.30 mm

Retinaculum
length 0.30 mm
widest 0.25 mm
ext. 0.07 mm

Translator
length 0.11 mm
wide 0.04 mm

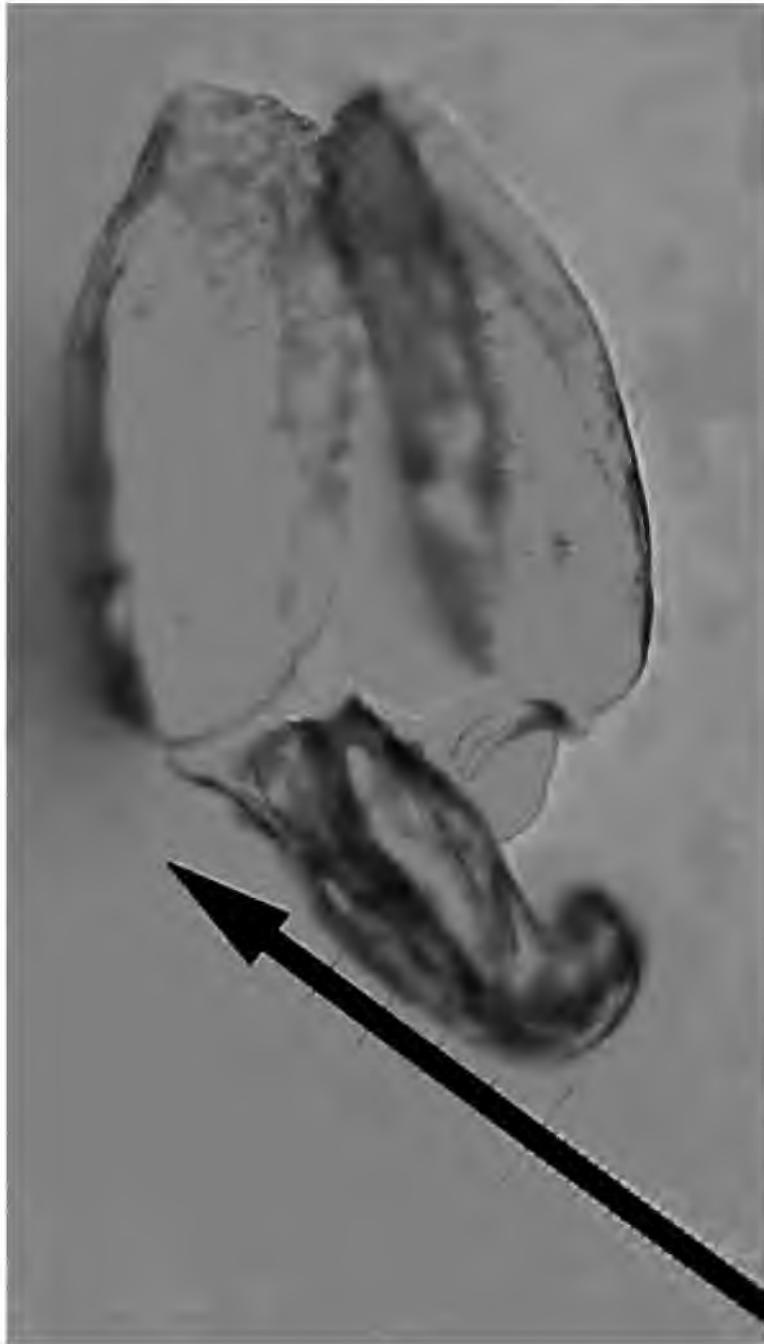
Caudicle bulb ca. 0.10 mm

The retinaculum in oval shapes with a small 0.07 indentation in the bottom I assumes is were the extensions curve under. .

***Hoya mindorensis* subsp. *siniloanensis* Kloppenburg**

(unpublished) #16

Pollinarium enlarged 170x.



normal position.

Pollinium

length	0.47 mm
widest	0.19 mm

Retinaculum

length	0.23 mm
widest	0.18 mm
ext.	0.16 mm

Translator

length	0.12 mm
widest	0.02 mm

Caudicle

bulb	0.08 x 0.05
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Translator/caudicle type:
ls/r

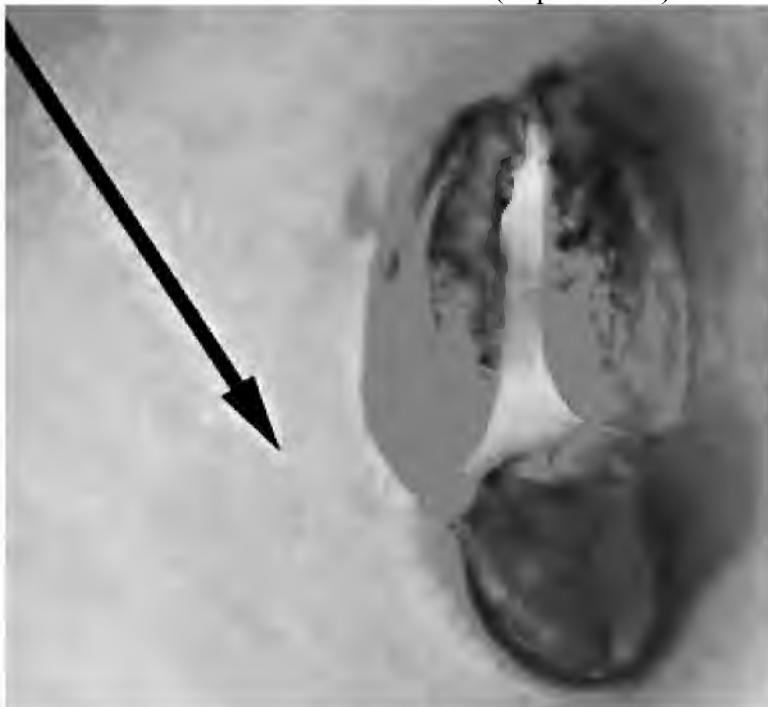
Pollinia inner end: R

Caudicle bulb: G

Retinacula character: LN

Here the retinaculum is twisted sideways and the extensions are long and curled to the right. Normally in this species the extensions are curled under the inner apex and are not visible. It seems evident that these structures are normally evidently rather long. The caudicle on the right has turned over from its

***Hoya mindorensis* subsp. *granulata* Kloppenburg, Guevarra & Carandang
(unpublished)**



Pollinaria **enlarged**
100x

Retinaculum length measured from head apex to the ext. (legs). So total length below would be 0.35 mm

Here the extensions are forward and rather enclosed. They are not wrapped under the main portion of the retinaculum.



Pollinaria **enlarged**
110x.

Pollinium
length 0.46 mm
widest 0.23 mm

Retinaculum
length 0.25 mm
widest 0.26 mm
ext. 0.10 mm

Translator
length 0.07 mm
width 0.01 mm

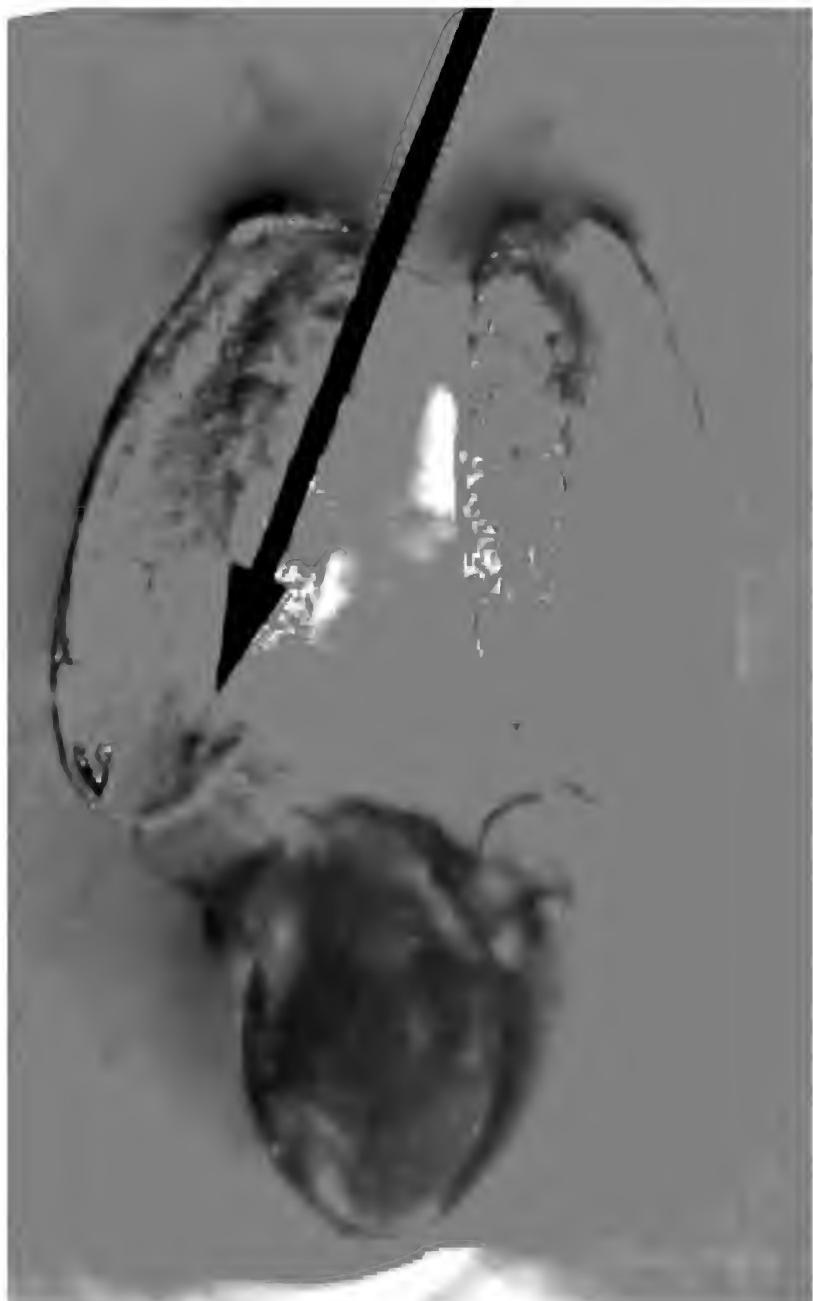
Caudicle
bulb 0.08 x 0.05 mm

Translator/ caudicle type: ls/r rectangle

Pollinia end type: R
Caudicle bulb: G

Retinacula character: LH

***Hoya mindorensis* subsp. *corollastriata* Kloppenburg & Mendoza**
(unpublished) GM #120



Pollinarium enlarged ca.
160x.

Pollinium

length	0.45 mm
widest	0.19 mm

Retinaculum

length	0.28 mm
widest	0.21 mm
ext.	0.02 mm

Translator

length	0.15 mm
wide	0.05 mm

Caudicle

bulb diam.	0.11 mm
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**Translator/caudicle
type:** ls/r

Pollinia apex type: R

Caudicle bulb: G fine

Retinacula character:
LH

***Hoya blashernaezii* subsp. *straminea* Kloppenburg & Mendoza**
(unpublished) GM #180



Pollinarium enlarged 160x

Pollinium

length	0.41 mm
widest	0.21 mm

Retinaculum

length	0.13 mm
shoulder	0.16 mm
waist	0.08 mm
hip	0.10 mm
ext.	0.05 mm

Translator

length	0.11 mm
widest	0.05 mm

Caudicle

bulb diam. 0.07 x 0.05 mm

Translator/caudicle type: ls/r

Pollinia apex type: R

Retinacula type: HU

Caudicle: C

Pollinia Types 2018
Cupped

1. **Hoya waymaniae** Kloppenburg 1995

Hoya waymaniae Kloppenburg 1995

Flower from MM Type clone.



Magnified approximately 165x.

Pollinium

length:	0.48 mm
widest:	0.12 mm

Retinaculum

length:	0.09 mm
shoulder:	0.07 mm
waist:	?
hip:	0.07 mm
ext.:	0.03 mm

Translators

length:	0.25 mm
depth:	0.04 mm

Caudicle

linear:	0.05 mm
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Translator/caudicle type: unique

Pollinia inner end type: R

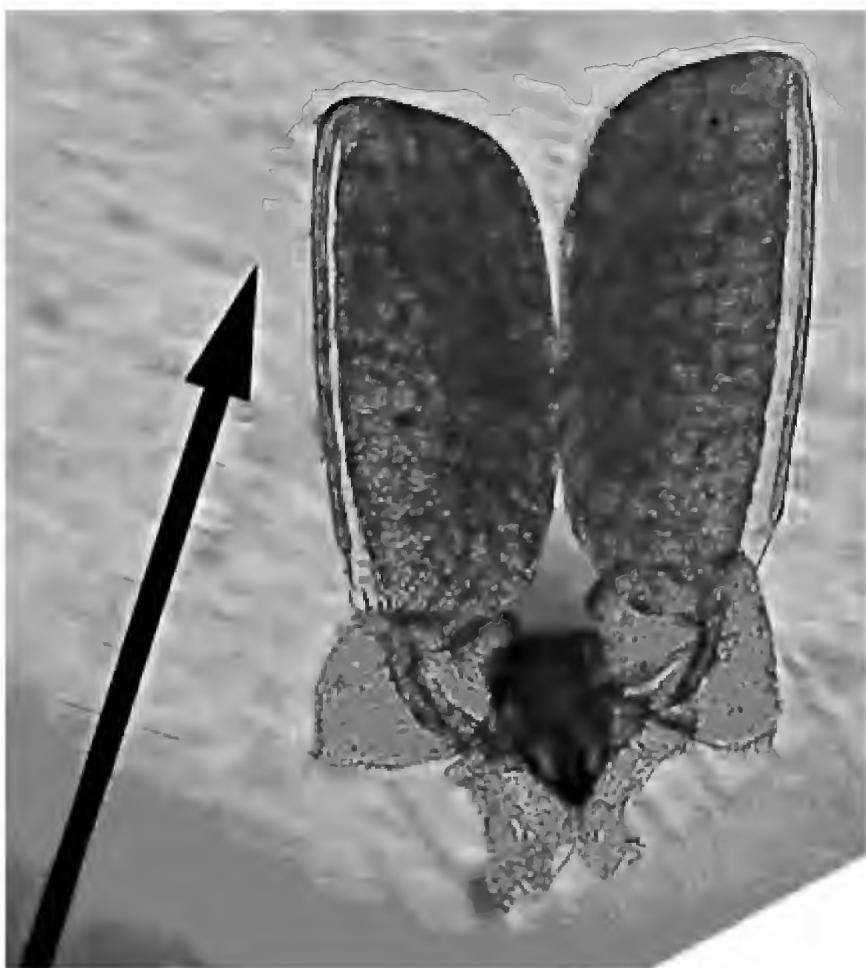
Caudicle bulb: G

Retinacula character: S

Pollinia Types 2018-9
t/o fe/o

1. **Hoya espaldoniana** Kloppenburg, Siar & Cajano 2014

Hoya espaldoniana Kloppenburg, Siar & Cajano 2014



Pollinaria
enlarged ca. 170x.

The pellucid edge barely extends to the pollinium inner apex and not to the inner apex nor to the caudicle attachment point. The translators are surrounded with irregular ovate non-clear tissue. It appears the translators are linear but also have short perpendicular extensions, are the irregular shaped portions the caudicle or are they hidden by these structures. **A very unusual and rare structural combination.**

Pollinium: length.....0.42 mm and widest..... 0.18 mm widest

Retinaculum: length.....0.10 mm; shoulder.....0.09 mm; wide, hip and waste similar extensions.....0.04 mm.

Translators: 0.15 mm long and 0.02 cm wide. **Caudicle:** bulb diameter ?0.10 mm.

Caudicle type: G

Retinacula character: S

Translator/caudicle: fe/o

Pollinia inner end type: T